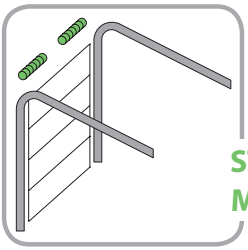
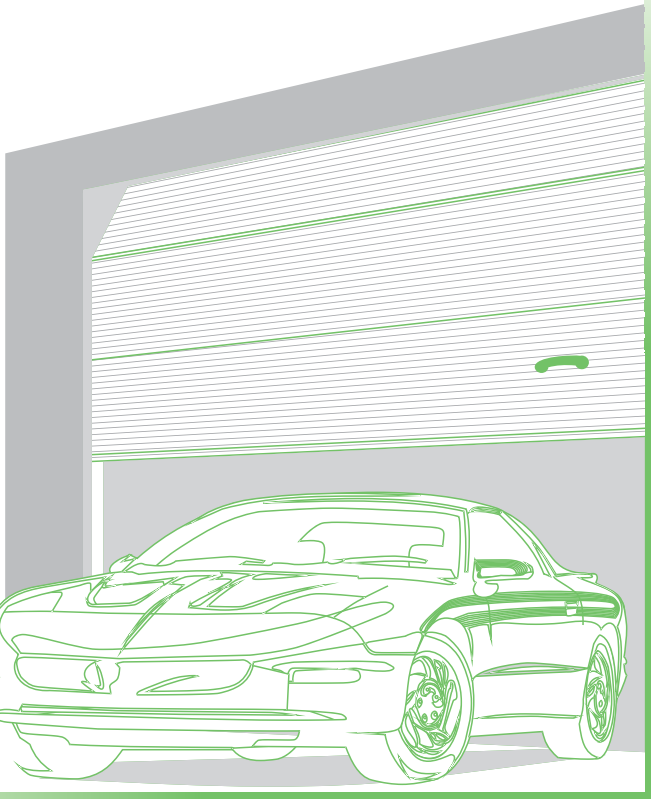
ALUTECH
DOOR SYSTEMS

INSTALLATION MANUAL

GARAGE DOORS



STANDARD MOUNTING



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INSTALLATION MANUAL
GARAGE DOORS
STANDARD MOUNTING

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Proper sectional door mounting is an essential condition for ensuring high consumer quality of goods.

In this Manual the recommended procedure and description of the main typical technology process operations on door mounting are given and also the list of the necessary instruments and accessories.

The present Manual may be used as guidelines in training and working of the technical staff. It is made basing on our knowledge and experience. All the rules and regulations, applying to door mounting, should be strictly observed.

The content of this document cannot be a basis for claims. ALUTECH Company reserves the right to change and make additions to the door configuration and this manual.

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1. GENERAL INSTRUCTIONS

1.1 OPTIMAL NUMBER OF MOUNTING CREW

Optimal number of mounting crew is 3 people. There should be a fitter in a crew while mounting an automated garage door.

An average norm for mounting crew is mounting of 1 door in 4 hours.

1.2 RECOMMENDED KIT OF TOOLS AND FIXINGS NEEDED FOR MOUNTING CREW

Tool title	Number, item.
Electric punch	2
Electric drill	1
Battery screwdriver	1
Electric corner cutoff machine	1
SDS adapter with quick-key vice	2
Riveting gun	1
Carpenter's bar levels (1,5 and 0,5m)	1 of each
Tool box	2
Fitter's hammer (400 g)	2
Impactor tools set (chisel, plugging chisel, punch, piercer)	1
Multi-purpose hack-saw with changeable blades	1
Scissors for metal	1
Side nippers of middle size	1
Big combination pliers	1
Files set	1
Hard metal screwdriver set	1
Magnet screwdriver with nozzles	1
Electro-indicated screwdriver	1
Hex key wrench assembly set	2
Straight bits and cap keys set	1
Open end and ring spanner set	1
SDS magnetic heads set	1
Bank of drills	1
Drill-machine for concrete Ø 6 mm L=160-200 mm	2
Drill-machine for concrete Ø 8 mm L=200-260 mm	2
Drill-machine for concrete Ø 10 mm L=550 mm	2
Drill-machine for concrete Ø 12 mm L=550 mm	2
Drill-machine for concrete Ø 14 mm L=750 mm	2
Taps set	1
Multipurpose tap holder	1
Chisel set	1
Silicon gun	1

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Tool title	Number, item.
Tester-equipment	1
Electric soldering iron 60 W	1
Strip 30 m minimum	1
Multi-purpose 4 fold step ladder	1
Multi-purpose step ladder of three section (more than 6 m)	2
Trammel 125 mm	1
Tape-measure 5 m	1
Tape-measure 10 m	1
Safety spectacles	2
Respirator	2
Headpiece	3
Protective gloves set	3
Multi-purpose first-aid set	1

2. SAFETY MEASURES

Only qualified personnel familiar with door design and its mounting process, trained and instructed on safety measures is admitted to door mounting. Safety measures description is given in Appendix.

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3. INSTALLATION AND FIXING RULES FOR DOOR BEARING CONSTRUCTION

3.1 REQUIREMENTS FOR MOUNTING

Doors should be placed symmetrically relatively to passage pintle.

On mounting door bearing bases should leveled in vertical planes.

The bearing rods should be leveled vertically while mounting a garage door. The gaps of 5 mm maximum are accepted. The difference of diagonals measured between two end points of bearing rods' ends should not exceed 2 mm.

Product elements mounting and leveling on the wall before their fixing may be carried out with the help of metal washers, mounted in area of fixing points.

Mounting accuracy of the product is controlled by the builder's level dimension type US6-1/US6-4 1-st group of accuracy State Standard 7502-89. It is accepted to use builder's levels and tape-measures of other types but not with less accuracy.

3.2 FIXING RULES FOR BEARING STRUCTURES OF DOORS

The door should be properly fixed not to pose any potential hazard for the life or health of people. Fixing points of the goods should ensure regular allocation of forces that effect the product and their secure transmission on building structure elements.

The choice of the fixing element depends on load distribution and durability of the building construction. Building constructions should stand the expansion force that appears while tightening fixing elements.

Wooden cork, construction foam is prohibited to use as fixing elements.

When the passage is made of solid mass materials, as concrete, natural stone, whole brick, then the fixing of door bearing elements is made directly to the passage (fig. 1)

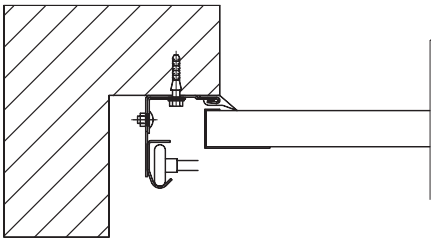

Fig. 1.

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When the passage is made of hollow materials, as economy brick (cavitated ceramic and lime-sand brick), ceramic slot and silicate stones, and also of light and cellular concrete, gas silicate blocks and other building materials with low compressive resistance, it is recommended to frame the construction passage with steel moulded profile (fig.2).

It is allowed to fix door bearing elements directly to the passage using fixing elements with increased enchoring length.

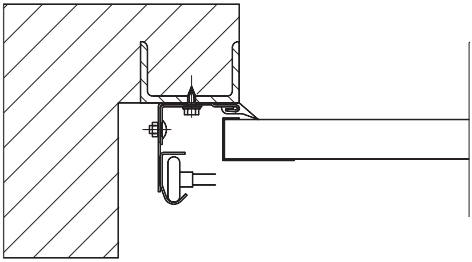

Fig. 2.

When the door mounting is made onto metal constructions it is necessary to use self-tapping screws or bolts with nuts.

If it is impossible to fix metal framing on the passage it is recommended to fix the doors with the help of tie rods.

Bearing rod strengthening is made with the use of corner brackets that are fixed to the passage and the rod. Fixing to the rod is made by two bolts (M6×16) with round head and nuts with a shoulder. The bolts are entered from the bracket side through ready aperture pairs in the rod (fig.3).

With the distance less than 125 mm from the end of the passage to the side wall, corner brackets may be installed only inside the bearing rod (fig. 3.1).

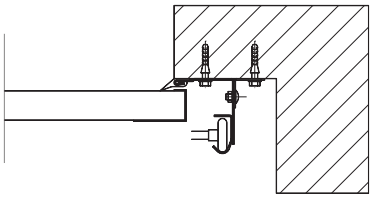

Fig. 3.

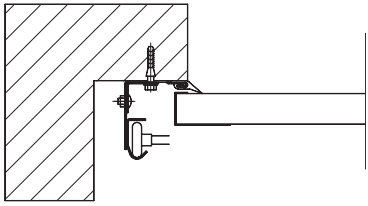

Fig. 3.1.

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3.3 FASTENING ELEMENTS FOR FIXING DOOR ELEMENTS TO BERING CONSTRUCTIONS

Different fastening elements may be used in door mounting, the choice depends on passage material characteristics.

All fixing parts should be resistant to corrosion.

Metallic frame tie (anchor) dowels (fig. 4), nylon dowels with inturn screws (fig. 4.1) are used to fix doors to the wall made of concrete, whole brick, ceramsite concrete, natural stone and other similar materials.

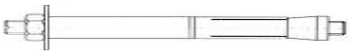

Fig. 4.

Fig. 4.1.

Oblong plastic dowels with inturn screws (160 mm long) are used to fix doors to the wall made of light and cellular concretes, bricks with vertical hollows, lime-gas blocks, shell limestone.

Anchor and dowel outer diameter – 10 mm.

For fixing doors to metal constructions it is necessary to use self-tapping screws with outer thread diameter 8 mm (fig. 4.2).

Fig. 4.2.

To provide secure door construction element pressing to building constructions under screw heads and nuts it is necessary to install flat steel washer with outer diameter – 24…30 mm, thickness – 1,6…2,0 mm.

Screws should be made of steel with corrosion-resistant coating with thickness not less than 9 micron. Screw strength grade not less than 5.6.

3.4 APERTURE PERFORMING FOR FIXING

The following drilling regimes for fixing element installation are recommended depending on wall construction material:

- Pure drilling regime (without punches). This regime is recommended for aperture performing in hollow brick, light and cellular concretes, lime-gas blocks, shell limestone and also in metal constructions;
- Drilling regime with light punches is recommended for aperture drilling in whole brick;
- Punching regime is recommended for walls of concrete with density more than 700 kg/m^3 and constructions of natural stone.

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The depth of aperture drilling should be one screw diameter more than the anchoring part of dowel.

The aperture diameter should not exceed the dowel diameter; the aperture should be clean of drilling waste.

Minimal dowel anchoring depth is given in the table below.

Wall material	Minimal depth, mm
Concrete	40
Whole brick	40
Brick with vertical hollows	60
Blocks of cellular natural stone	50
Light concrete	60

3.5 REQUIREMENTS TO THE PASSAGES OF THE PREMISES

We draw the attention of our partners, that the essential precondition for the door mounting with the least expenses is the quality preparation of passage frame for door installation. It's very important for the first step to carefully measure the passage, mentioning the material of walls and their thickness.

Prepared passages should meet the following requirements:

- the passages should be of a rectangular shape or other shape, agreed by the Customer and the Producer;
- the surface of frame planes should be straight and smooth, without burls of plaster or cracks.
- the deviation of work surfaces from vertical and horizontal lines should not exceed 1,5 mm/m, but not more than 5 mm.
- the area, needed for door mounting, should be free from building, heating piping, and ventilation etc.

If the passages are prepared by the Customer with deviations from the presented norms, the Customer is to eliminate them before door mounting start.

3.6 FINISHED PASSAGE CHECK

Before starting door mounting it is necessary to make sure the quality of the prepared passage is satisfactory (see part 3.5).

It is necessary to check if the existing space dimensions necessary for door mounting correspond the demands pointed out in the document "Design description and technical guide for garage door mounting of Standard series".

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4. DOOR MOUNTING

4.1 PREPARATION BEFORE MOUNTING

Before mounting it is necessary to make installation marks from both sides of passage (fig. 5). The marks are made at 1 m distance from zero mark (the level of the clean floor) using flexible liquid level or squared level used with measuring profile (headroom from the door set).

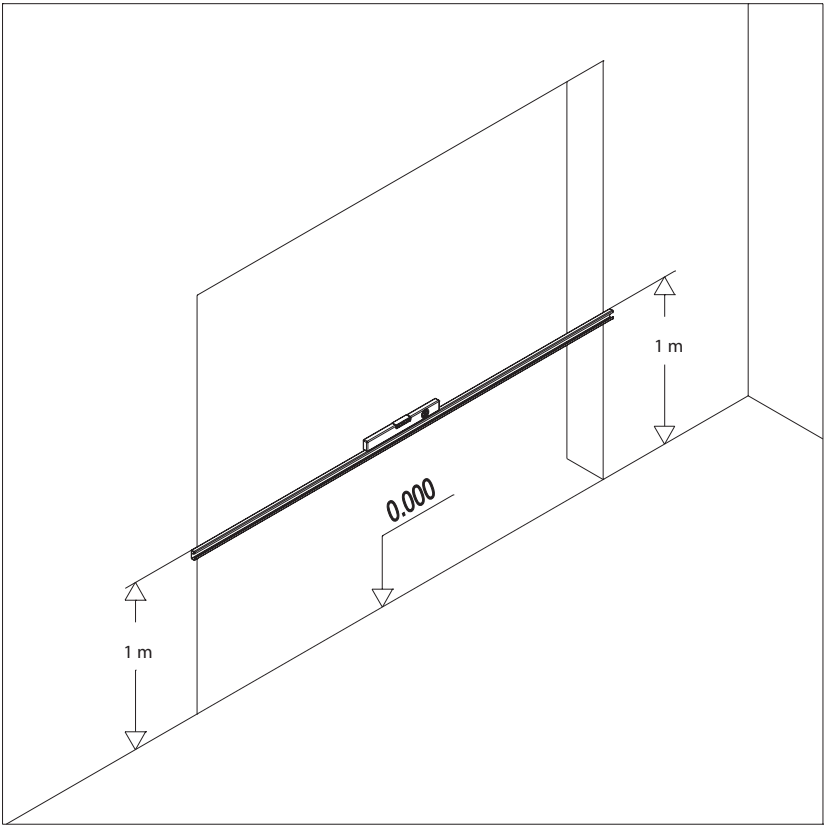

Fig. 5. Installation marks making

4.2 DOOR BEARING CARCASS MOUNTING

Door bearing carcass consists of two bearing rods with vertical tracks (1) and seals, two radius profiles (2), two horizontal tracks (3), panel strip (4) with seal and rear headroom (5). The scheme of the bearing carcass is shown in fig. 6.

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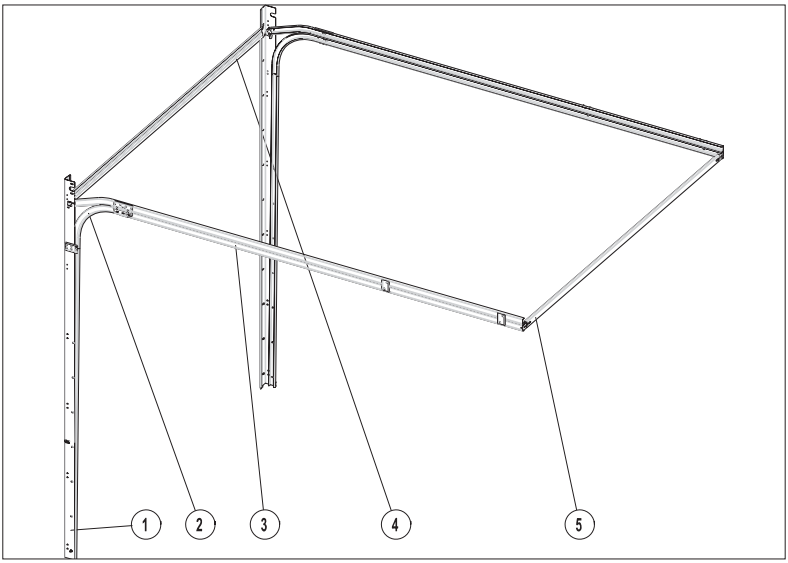

1 – bearing rod with vertical track and seal
2 – radius profile
3 – horizontal track
4 – panel strip with seal
5 – rear headroom

Fig. 6. Door bearing carcass scheme

4.2.1 DOOR BEARING CARCASS VERTICAL FRAME ASSEMBLY

In garage doors with standard mounting bearing carcass vertical frame consists of four main elements – two bearing rods connected with panel strip and measure profile (fig. 7)

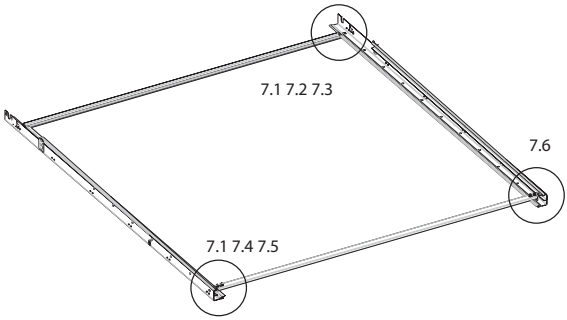

Fig. 7. Door bearing carcass vertical frame in assemblage

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Vertical frame assembly is done in the following order:

- Place seals into panel strip and bearing rods as shown in fig. 7.1.

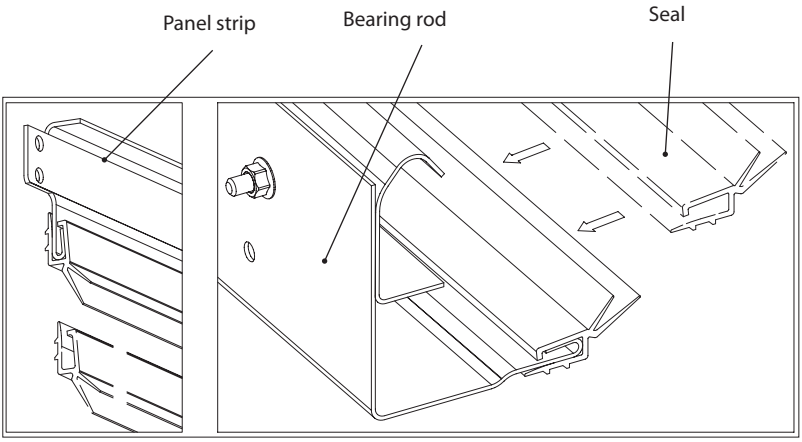

Fig. 7.1. Seal installation

- Cut seals that are installed into bearing rods (fig. 7.2.). Elastic part of the element is cut in such a way that seal closing of bearing rod and panel strip is overlapping on elastic parts. Panel strip seal should overlap the seal of the bearing rod (Facing from outside the door).

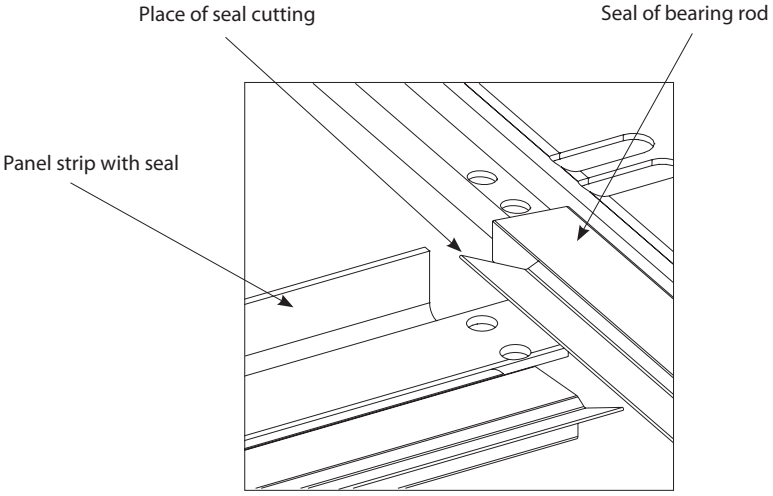

Fig. 7.2. Cutting of bearing rod seal

- Connect bearing rods with panel strip with two M6×12 press-bolts and nuts with shoulders (fig. 7.3).

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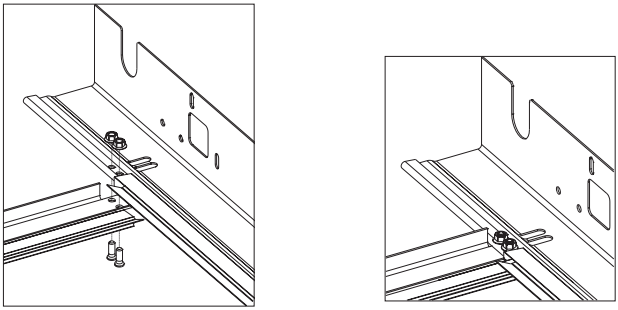

Fig. 7.3. Panel strip installation

- To assemble measuring profile it is necessary to place measuring profile brackets at headroom butts (fig. 7.4.) and fix them with two M×25 round-head bolts and nuts with shoulders (fig. 7.5).

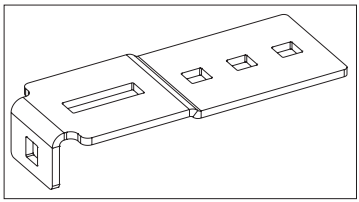

Fig. 7.4. Measure profile bracket

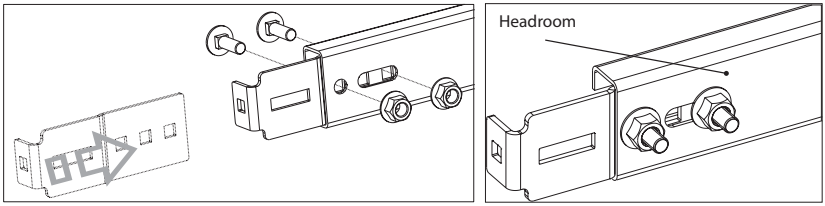

Fig. 7.5. Measure profile bracket installation

- Fix measure profile to bearing rods (fig. 7.6). To do that please follow instructions below:
  - Unscrew the M6×16 lower press-bolt nuts that fix vertical track to bearing rod, extract press-nuts;
  - Place measure profile between bearing rods;
  - Fix press-bolts from outside of measure profile. Set and tighten the nuts.

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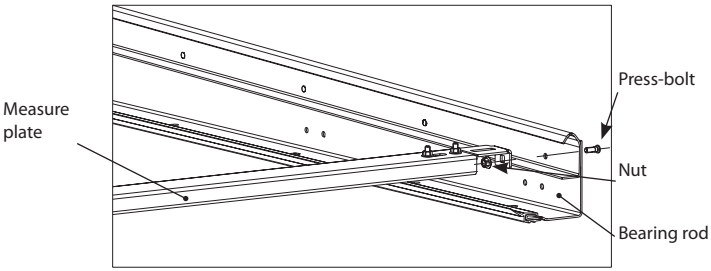

Fig. 7.6. Measure profile installation

4.2.2 DOOR BEARING CARCASS VERTICAL FRAME FIXING

Fixing of the assembled vertical frame of door bearing carcass to the passage is made in the following order:

1) Put the frame to the passage;

2) symmetrize the frame to passage;

3) Level and fix the frame in the vertical plane, match notchings in the bearing rods with meter marks on the passage (fig. 8);

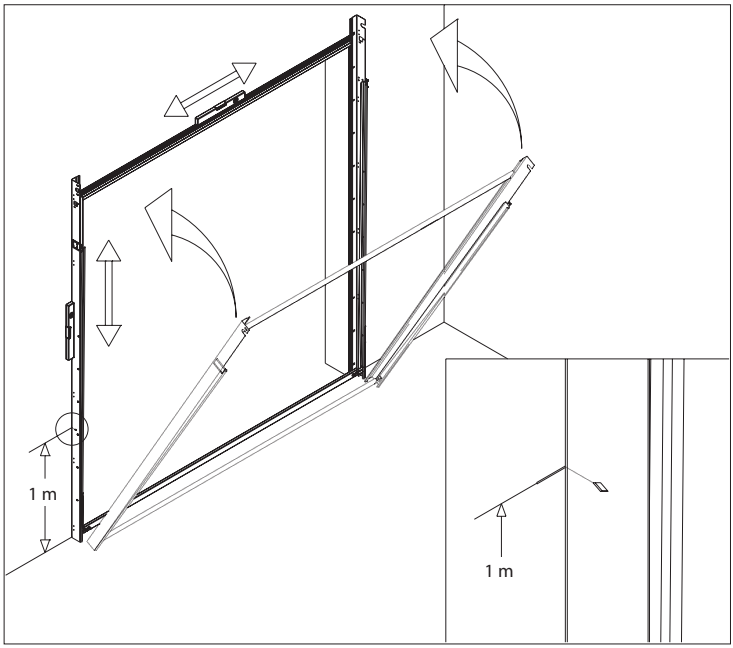

Fig. 8.

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4) on the rods fix reinforcing side brackets with M6×16 round-head bolts and nuts with shoulders. Reinforcing side bracket installation variant outside bearing rods is shown in fig. 9.1, inside bearing rods – in fig. 9.2.

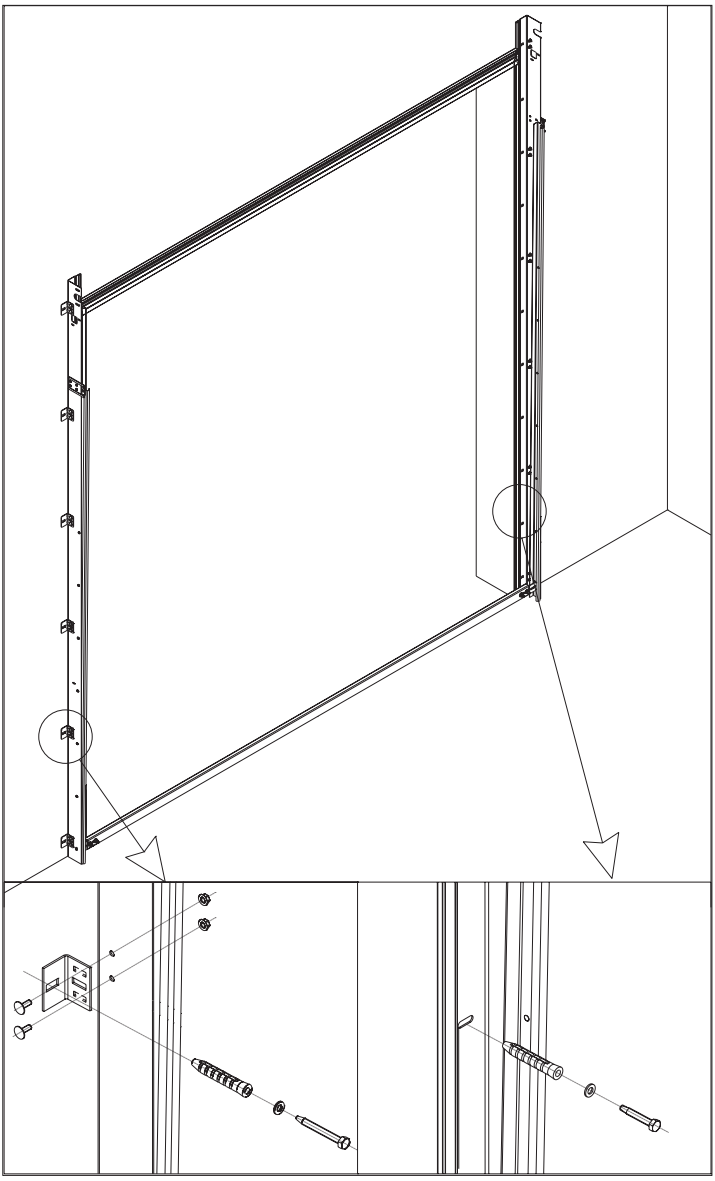

Fig. 9.1.

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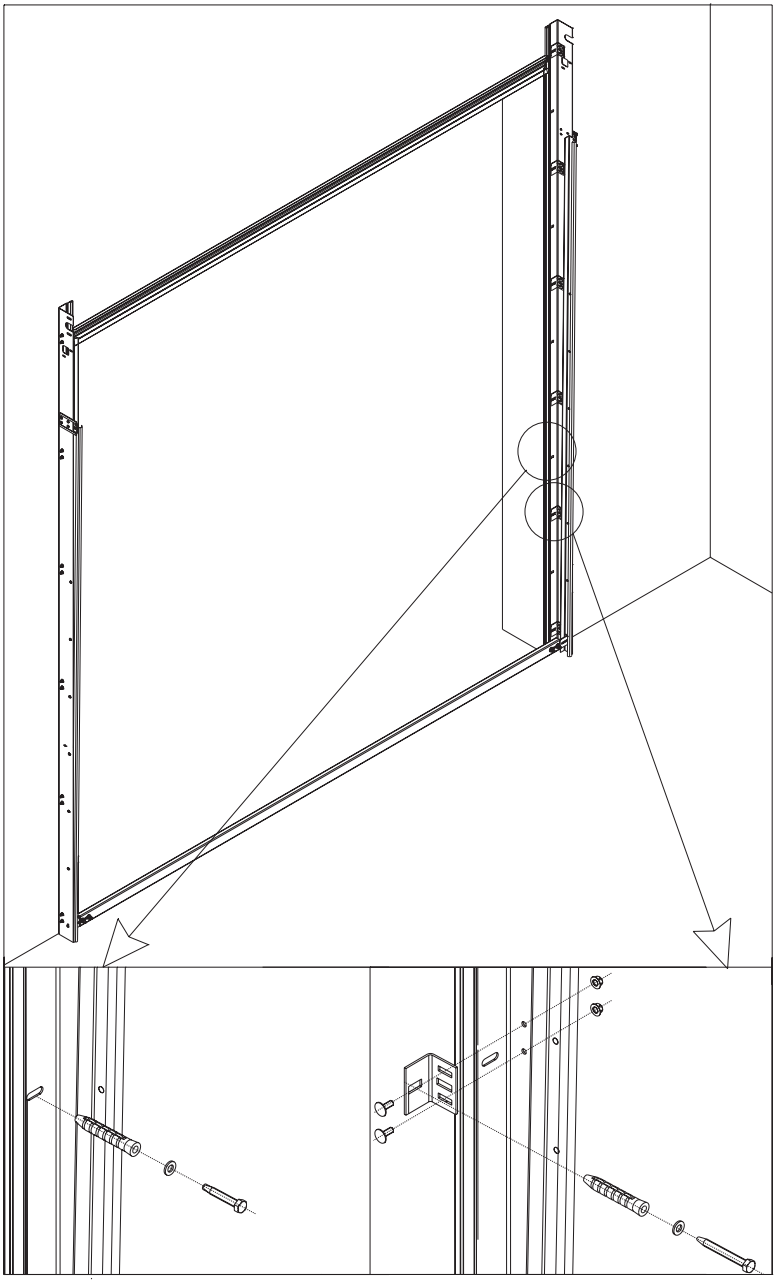

Fig. 9.2.

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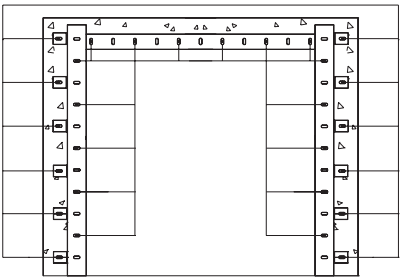
5) On the wall mark the places where apertures for fixing elements will be (dowels, screws, etc.);

Scheme of door bearing carcass vertical frame fixing elements placing is presented on fig. 10.1 and 10.2.

When reinforcing corner brackets are installed on the outer side of bearing rods (fig. 10.1), rod and brackets' fixing elements are staggered.

When reinforcing corner brackets are installed on the inside of bearing rods (fig. 10.2), fixing elements are placed in each perforating hole, drilled in the rod shelf.

It's recommended to carry out panel strip fixing to the passage in every second perforating hole.



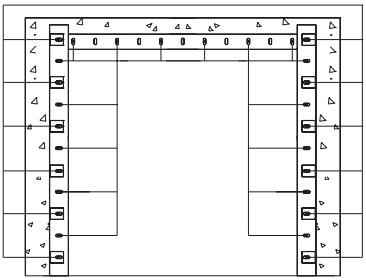


Fig. 10.1, *fig. 10.2.* Fixing places

6) according to the marking executed drill in the wall the apertures of the necessary size for fixing elements;

7) place the fixing elements, tighten them controlling the fixed bearing rods verticality;

8) Remove measure profile, for this purpose unfasten and extract the nuts of press-bolts (fig. 11.1);

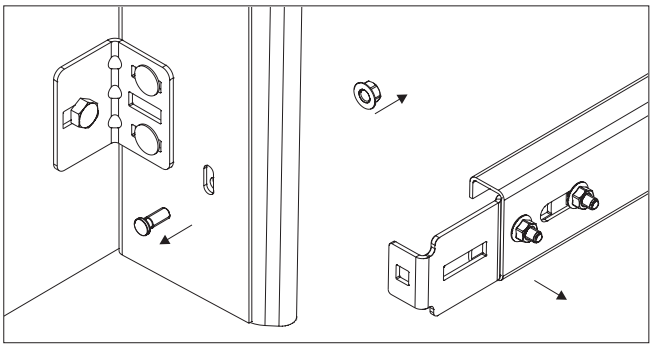


Fig. 11.1.

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9) Place press-bolts from the inside of bearing rod (fig.11.2). Place and fasten the nuts with a wrench.

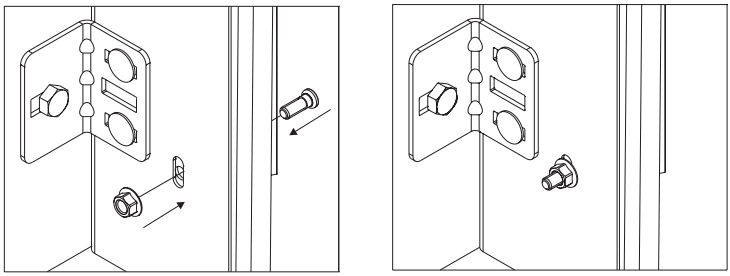

Fig. 11.2.

4.2.3 ASSEMBLY AND FIXING OF HORIZONTAL TRACKS TO BEARING RODS

Assembly and fixing of horizontal tracks to bearing rods is shown in fig. 12

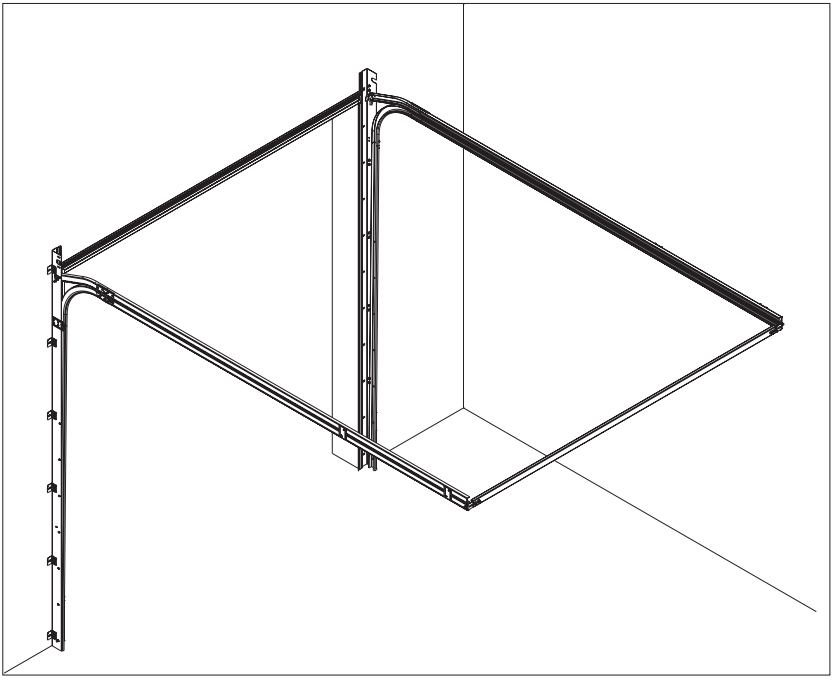

Fig. 12.

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Horizontal tracks assembly and fixing is made in the following way:

1) Assemble horizontal track with radius profile. To fix radius profile to horizontal track joint plate install two M6×16 press-bolts and nuts with shoulders (fig. 12.1)

Place bolts from inside of the profile.

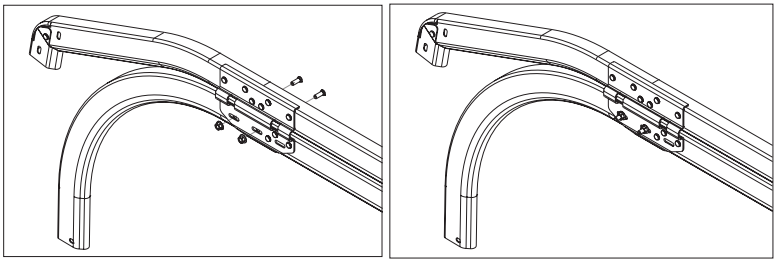

Fig. 12.1.

Vertical track and radius profile rolling path edges should be matched to provide punchless rolling of feed rollers (fig. 12.2);

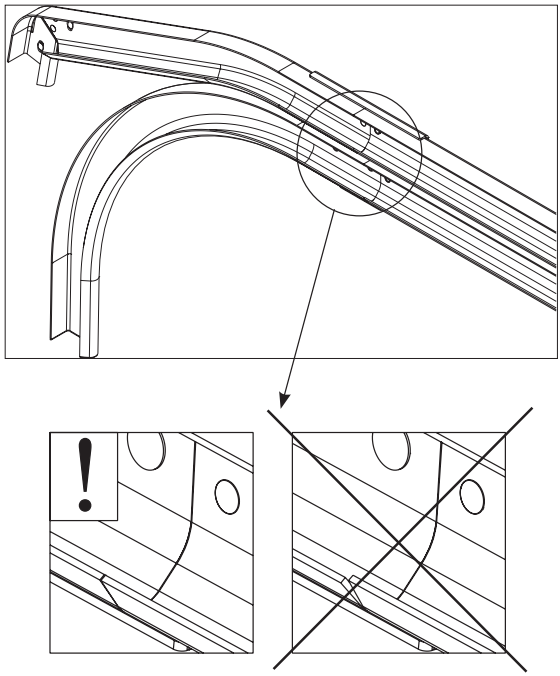

Fig. 12.2.

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2) put horizontal track to bearing rod (fig. 12.3).

To fix radius profile to bearing rod fixing plate it is necessary to install one M6×16 press-bolt and nut with shoulder.

To fix horizontal track to bearing rod it is necessary to install two M6×16 press-bolts. Place the bolts from the inside of the profile.

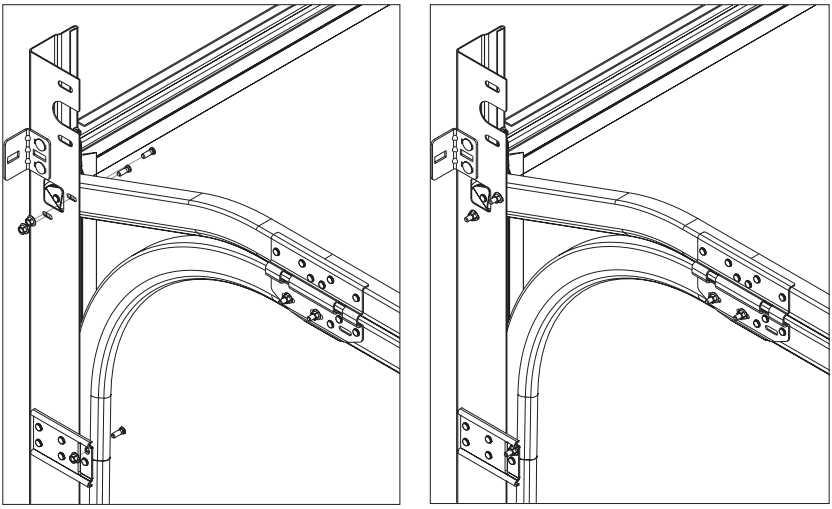
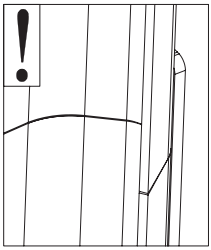
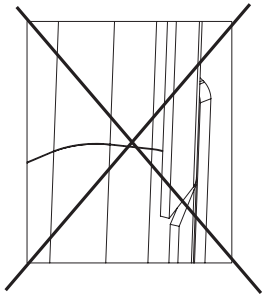


Fig. 12.3.

Vertical track and radius profile rolling path edges should be matched;





3) Fix track in horizontal position with the help of accessory rods or at the expense of hanging on the rope to the ceiling construction elements. Check track horizontality with builder's bar level.

Fix another track to bearing rod analogically;

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4) mount rear headroom. Measure plate in assembly can be used as rear headroom.
Its fixing to horizontal track is done with M8×25 round head bolts and shoulder nuts. (fig. 13).

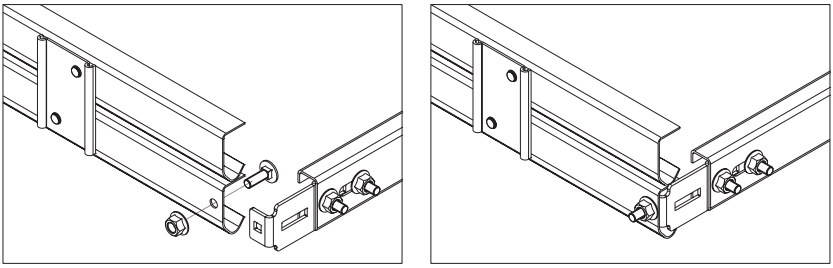

Fig. 13.

5) check horizontality of track installation and fastening element tightening.

4.2.4 HORIZONTAL TRACK FIXING TO CEILING CONSTRUCTIONS OF GARAGE PREMISES

Horizontal track fixing to ceiling constructions of garage premises is performed with the help of special hangers. Hangers are situated along horizontal tracks (fig. 14). The front hanger should be placed at a distance of 900 mm from the garage premises opening. The back hanger is placed at a distance of 300 mm from the edge of a horizontal track. If an additional hanger is included into the door set it is placed at the equal distance between the main hangers.

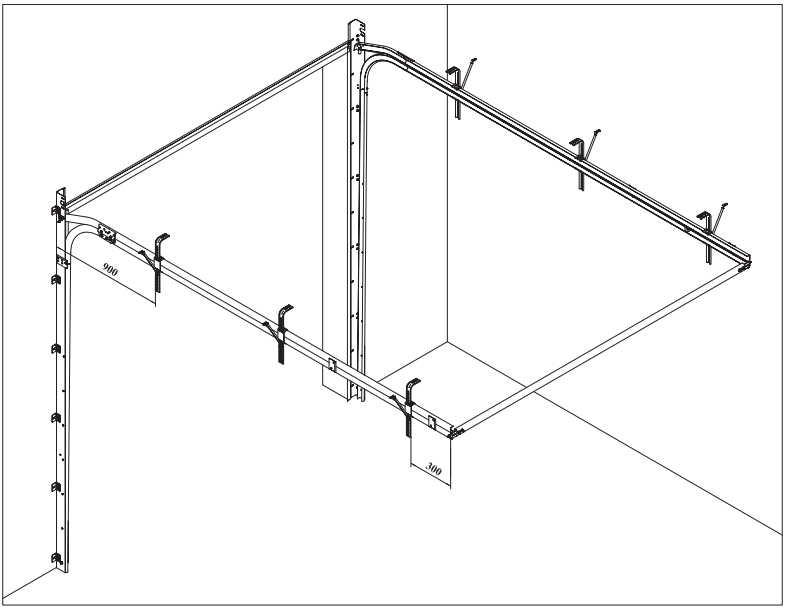

Fig. 14

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Hanger mounting is performed in the following order (Pic.15):

- Put the hanger bracket (1) into the bracket (2), covering the horizontal track;
- Install the detail on the horizontal track (Pic.15a);
- Fold the bracket nibs (2) as it is shown in Pic.15b;
- Fold the front edge of the bracket (2) inside the track as it is shown in Pic.15c;
- Fix the hanger bracket (1) to the bracket (2) with a bolt M6×16 with the semicircular cap and a nut with a bead;
- Fix the hanger brace (3) to the bracket (1) with a screw M6×16 with the semicircular cap and a nut with a bead;
- Check the diagonals congruence of the doors upper carcass frame;
- The hanger is fixed to the ceiling construction of the garage premises as it is shown in fig. 15d;
- If required, cut off the excess lower part of the hanger bracket (1).

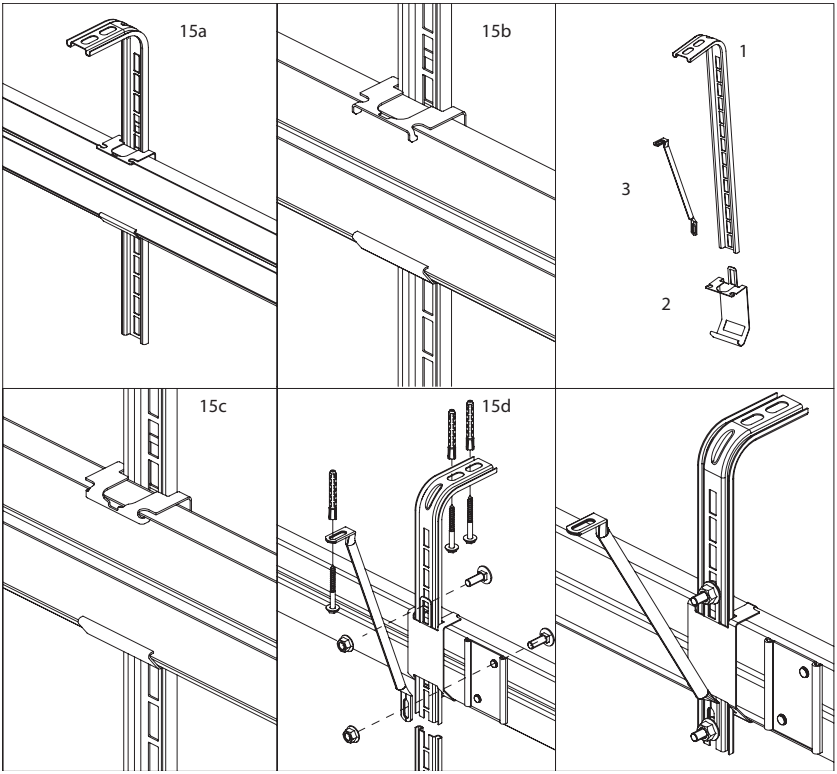

Fig. 15

After the bearing carcass is fixed to the constructions of the garage premises the compulsory test of mounting and fixing elements must be carried out.

For normal doors operation it is obligatory to level the diagonals of the upper frame of the doors carcass.

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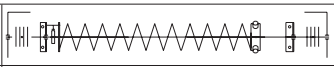
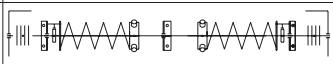
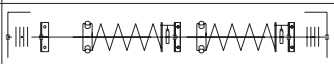
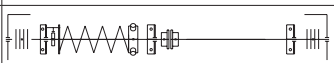
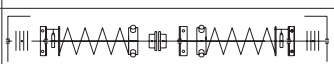
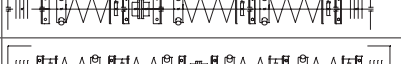
4.3 TORSION SHAFT INSTALLATION

Torsion shaft construction variants and assembly rules

- Torsion shafts can have different variants of configuration and assembly.
- The variants of installation of one, two, three or four springs are possible. The springs can have the same as well as reverse spiraling direction. Moreover, the installations of the whole (continuous) shaft and shaft consisting of two parts is possible.
- The following conditions should be carried out in assembly and mounting of shaft:
  - In area where coupler adjustable and cable drums are installed it is obligatory to have supporting shaft element – spring break device or intermediate bracket;
  - For the doors of more than 4100 mm in width installation of two intermediate supports is necessary.

Possible variants of torsion shafts mounting schemes are presented on fig. 16.

1		Whole shaft. One spring
2		Whole shaft. Two springs of reverse spiraling direction
3		Whole shaft. Two springs of the same spiraling direction
4		Divided shaft. One spring
5		Divided shaft. Two springs of reverse spiraling direction
6		Divided shaft. Two springs of reverse spiraling direction. Door width more than 4100 mm
7		Divided shaft. Two springs of the same spiraling direction
8		Divided shaft. Three springs
9		Divided shaft. Three springs of the same spiraling direction.
10		Divided shaft. Four springs

Graphics

Bearing rod with bearing support

Spring break device with bearing support

Spring with tips

Intermediate bracket

Cable drum

Coupler adjustable

Fig. 16.

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4.3.1 PREPARATION BEFORE MOUNTING

- It's necessary to conduct shaft assembly before mounting. Below please find the order of torsion shaft assembly (fig. 17). By assembling the following requirements should be met:

  – Left spring fitting and cable drum (code LH), with red marks, should be installed on the left side of the shaft, when looking from the inside of the premises. Right spring fitting and cable drum (code RH), with black marks, should be placed on the right side of the shaft;
  – Left spring should be marked by a red line, right – by any other color;
  – Cable drums are set on the shaft in such a way, that the slot for the cable, on butt-end of the drum, was placed from the outer side.

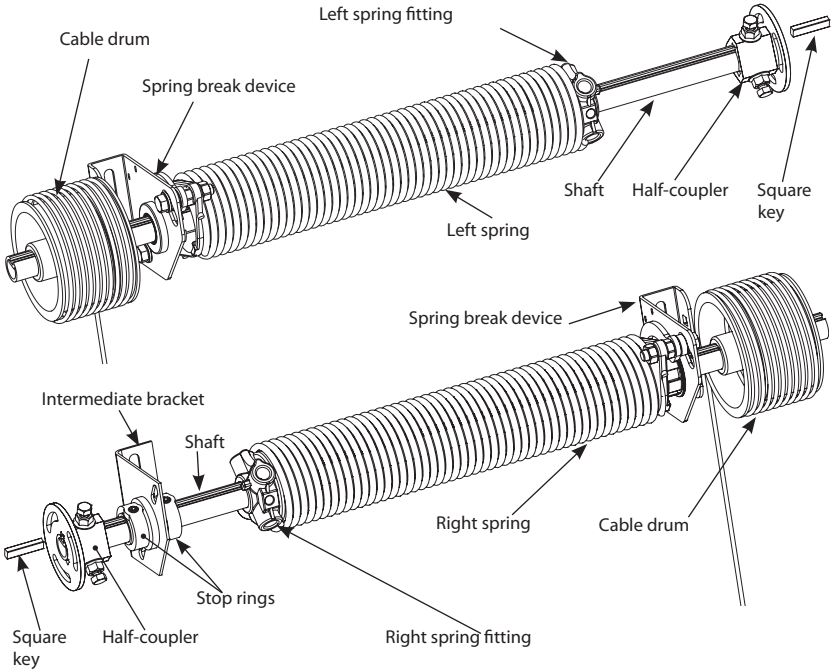

Fig. 17

- Mounting is done in the following order:
- Mount the right shaft part:

  1) Dismantle the coupler adjustable;

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2) Set half-coupler on the shaft, connecting shaft butt end and bearing surface of half-coupler flange. Set square key into half-coupler and shaft grooving. Tighten the set screw firmly to shaft;

3) Wrench the screw, remove half-coupler from shaft. By the given screw mark drill the shaft 0.5-1.0 mm deep.

4) Set half-coupler onto shaft;

5) Fix half-coupler on shaft, tightening set screws with a wrench;

6) Set stop ring on shaft;

7) Set intermediate bracket on shaft;

8) Set the second stop ring on shaft;

9) Set ready-fitted spring with tips;

10) Put on shaft spring break device ratchet gear

11) Set spring break device on shaft (fig. 17.1) and fix it to spring tip with the help of 2 bolts out of coupler set (fig. 17.2);

12) Fix the drum by tightening set screw with a small effort.

- Mount the left shaft part analogically, setting half-coupling, spring, spring break device and cable drum. For doors more than 4100 mm wide intermediate bracket is also mounted onto the left shaft.

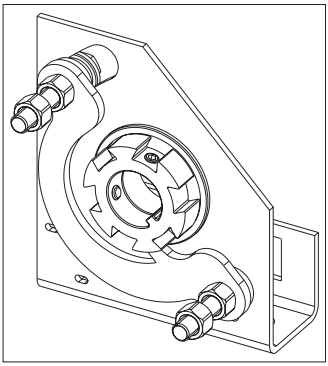

Fig. 17.1.

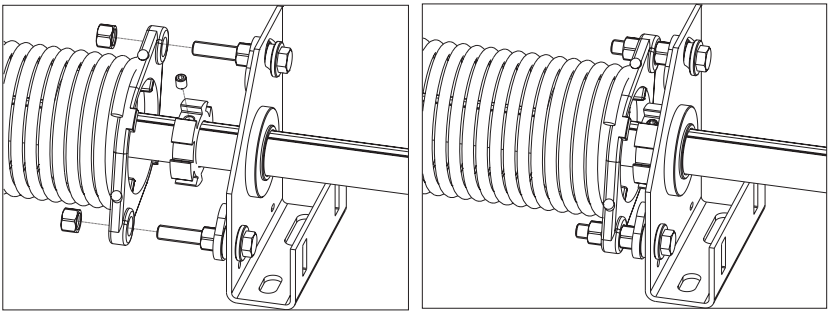

Fig. 17.2.

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4.3.2 4.3.2 Shaft MOUNTING ON THE PASSAGE

- Shaft mounting (fig. 18) is done in the following order:

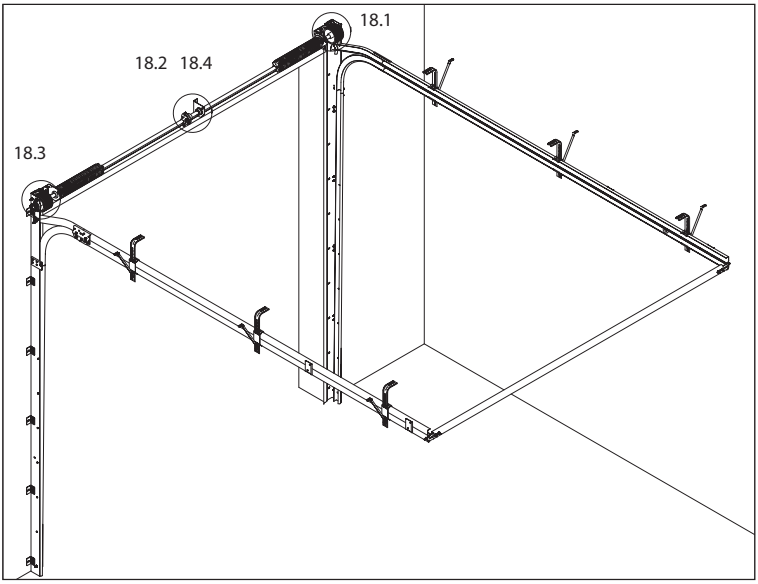

Fig. 18.

1) Mount part of shaft, installed from the right side of doors (cable drum is not provisionally shown on the left figure) according to fig. 18.1:

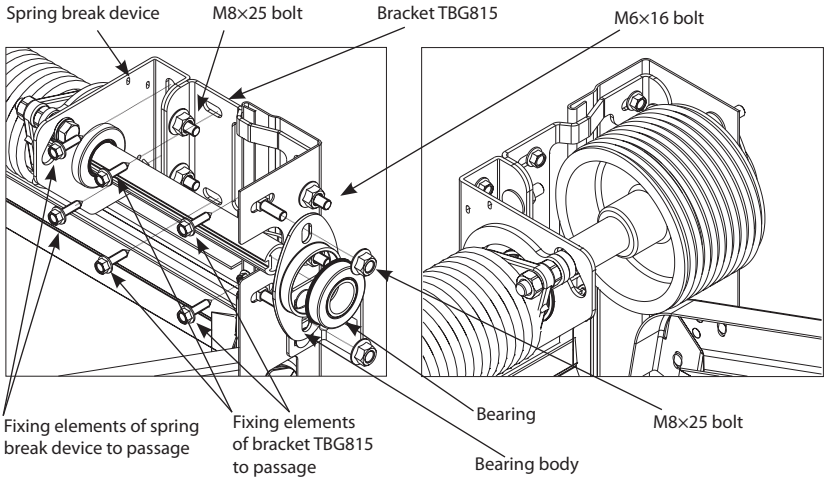

Fig. 18.1.

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- Place TBG815 bracket inside bearing rod and fix to it with two M6×16 roundhead bolts and nuts;
- To fix TBG815 bracket to the passage drill 4 apertures of necessary diameter for fastening element installation. Make apertures through TBG815 bracket holes.
- Install fastening elements and tighten them;
- Place shaft in assembly into bearing rod location slot;
- Install bearing into bearing body. Install the given subassembling onto shaft and fix it to bearing rod with two M8x25 roundhead bolts and nuts;
- Holding shaft in horizontal position tighten spring break device and TBG815 brackets with two M8×25 roundhead bolts and nuts;
- Holding shaft in horizontal position mark 2 apertures for fixing spring break device bracket to passage headroom;
- Drill in the passage headroom two apertures of necessary dimensions for spring break device fastening element installation;
- Install and tighten fastening elements;
- Holding shafts in horizontal position mark 2 apertures for intermediate bracket installation. The bracket is installed with a 50 mm shift towards passage central axis. If it is necessary to move intermediate bracket closer or behind passage axis, mind spring extension when it stretches when determining bracket position. Minimal distance A (fig. 18.2) between spring fitting (spring is not winded) and intermediate bracket is counted considering spring length extension when it is winded by formula:

$$A = d \cdot n + 5, \text{ where:}$$

A – distance between spring tip to intermediate bracket, mm;

d – spring wire diameter, mm;

n – number of spring winding turns.

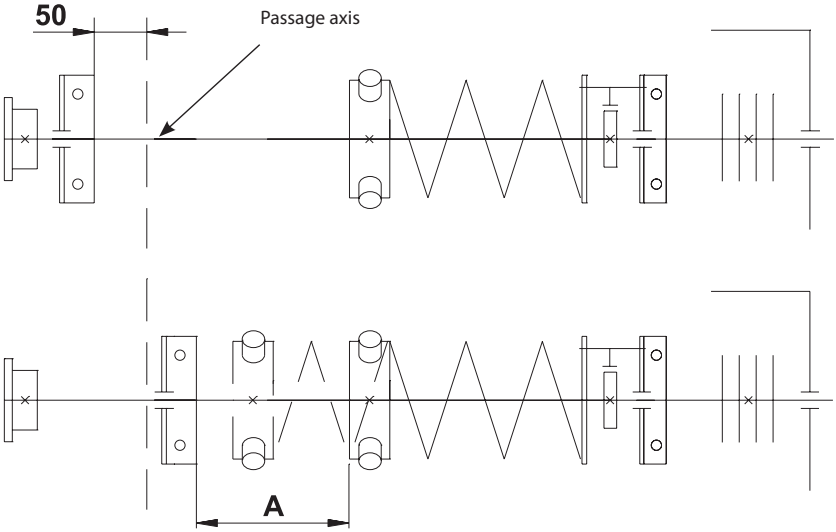

Fig. 18.2

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- Drill in passage headroom two apertures of necessary dimension for intermediate bracket fastening element installation;
- Install fastening elements and tighten them preliminarily, providing free bracket vertical moving;
- Check shaft horizontality and make final intermediate bracket fastening element tightening;
- Install stop rings close to inner intermediate bracket bearing race and fix them by tightening set screws.

2) Mount part of shaft, installed from the left side of doors (fig. 18.3). It is done analogically to shaft mounted from the right side.

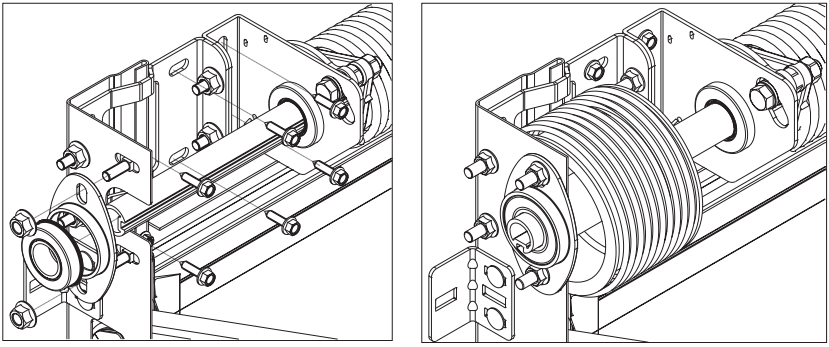

Fig. 18.3

3) Join shafts with a coupling, installing clutch coupler bolts, make preliminary nut tightening (fig. 18.4).

Key grooves of both shafts should be placed in one line.

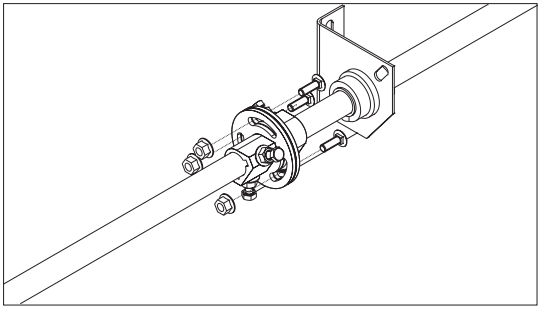

Fig. 18.4

4) adjust shaft position and its final fixing:

- Check horizontal placement and coaxiality of shafts;
- Check tightening of fixing elements of spring break device brackets and intermediate bracket.

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4.3.3 SPRING BREAK DEVICE PREPARATION

For rope unwinding from the drums it is necessary to make spring break device preparation (fig. 19) that is as follows:

1) spring break device gear wheel is placed in such a way that fixing plane cog would not enter the slot (move the wheel to the spring side – the direction is shown by an arrow in fig. 20). With this you provide free rotation of shaft relatively spring break device which is necessary for further rope tension adjustment.

1) Fix the ratchet wheel on the bearing rod, fastening installation bolts. To provide the access to installation screws, it's possible to turn the shaft..

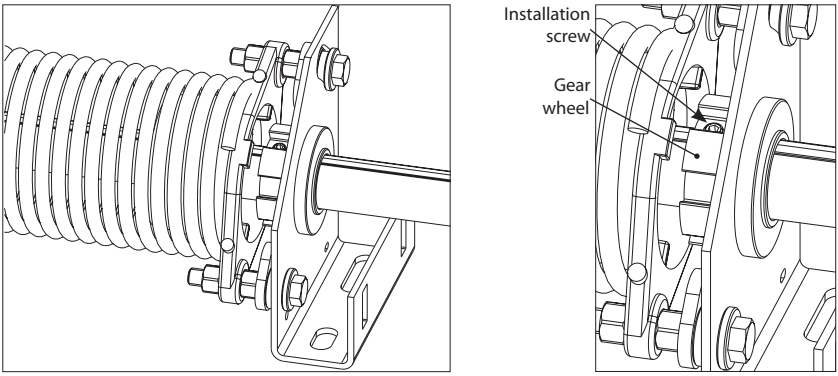

Fig. 19.

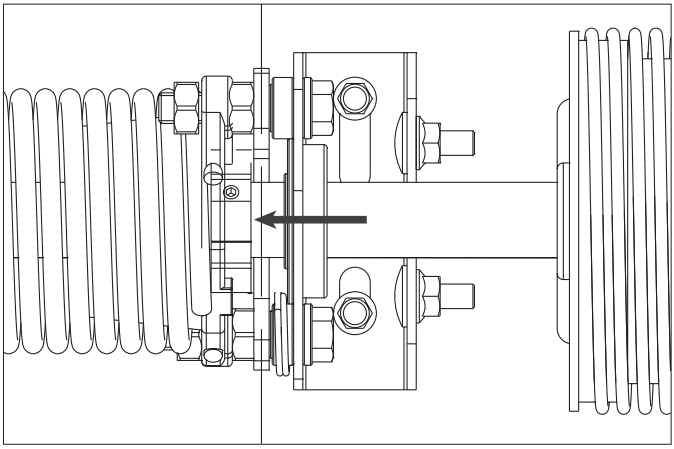

Fig. 20.

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4.4 DOOR LEAF INSTALLATION. DOORS WITHOUT A WICKET

4.4.1 BOTTOM SECTION INSTALLATION

Assembly and installation of door leaf bottom section is held in the following order:

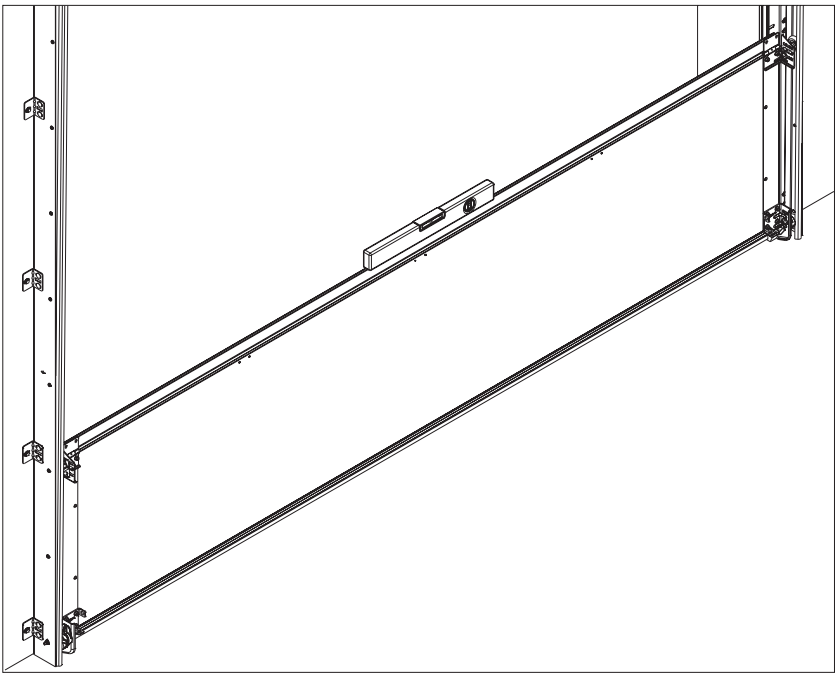

Fig. 21.

1) Fix the panel on the mounting place. Use, when needed, supports, level the panel in the horizontal position with the help of carpenter's bar level. Support height should be no more than 10 mm maximum;

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2) Install and fix side hinges to the section. Hinge is delivered in assembly and consists of bracket and runner which axis is placed inside the body. The body is fixed to the bracket with a screw and a nut (fig. 21.1). Bottom half-loop is fixed with two 6,3×16 self-tapping screws (fig. 21.2).

Before hinge installation on rollers put Litol-24 lubricant.

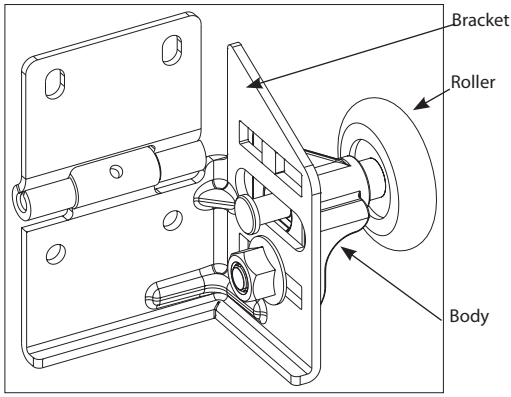

Fig. 21.1.

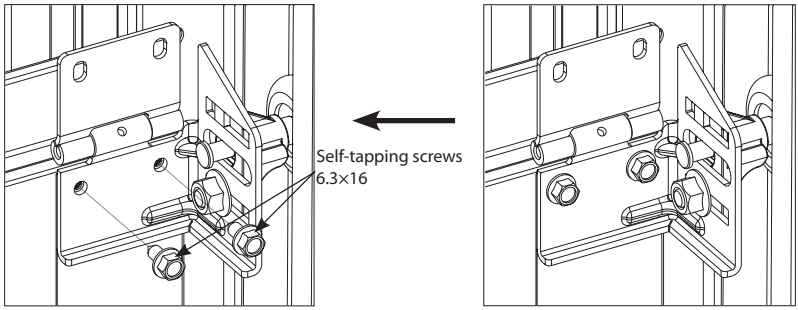

Fig. 21.2.

3) before fixing cable drums on shaft it is necessary to level them placing in such a way that the ropes do not touch door elements on their lifting.

Drum position adjustment in relation to shaft in axial position is made in the following order:

- Turn the set screw in the drum hub on the figure needed for free axial movement of hanger drum on shaft;
- Level the drum in the proper axial position;

4) turning shaft slowly unwind the ropes

It is forbidden to unwind ropes from the drums that are put off the shaft to avoid rope kink that can lead to rope lay splitting;

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5) put on rope loops on bottom bracket pins (fig. 21.3). To fix the rope put washer on the pin and splint;

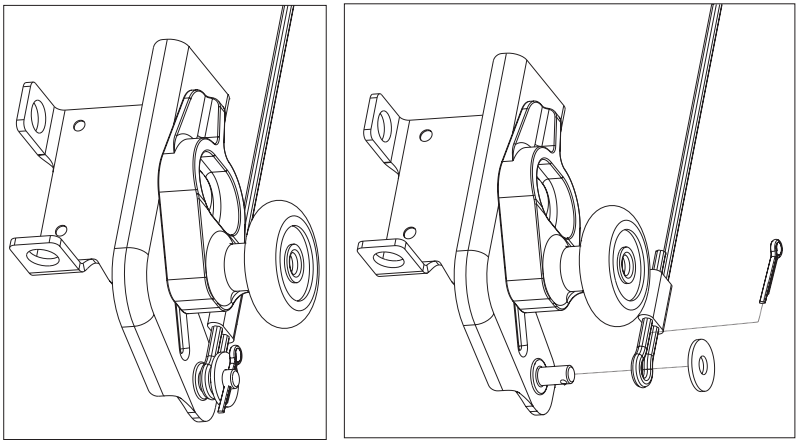

Fig. 21.3.

6) install and fix bottom brackets on the section (fig.21.4):

- put Litol-24 lubrication on rollers;
- place rollers into vertical tracks and fix the bracket with four 6,3×16 self-tapping screws.

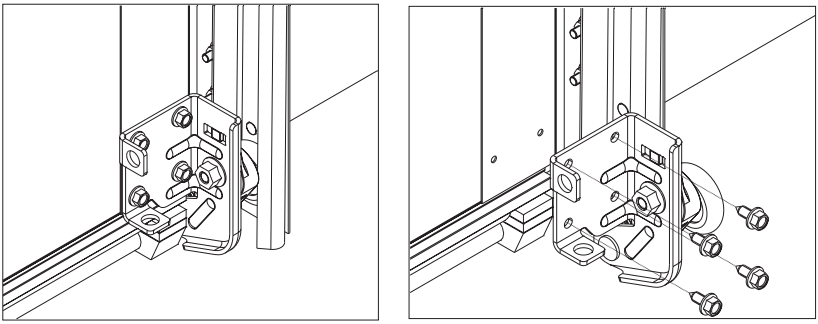

Fig. 21.4.

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4.4.2 ROPE TIGHTENING REGULATION

For regular door exploitation ropes should be tightened. No rope sagging is admitted.

Rope tightening regulation

- after bottom bracket fixing on the door leaf section it is necessary to install a pin and fix drum position by tightening set screw (fig. 22.1).
-

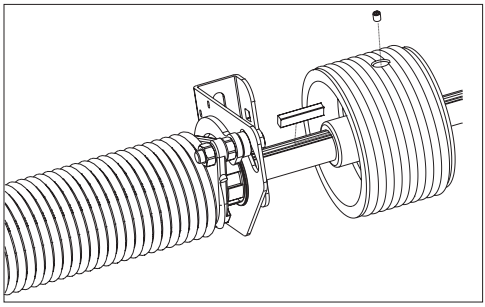

Fig. 22.1.

- turn shaft till rope sagging is adjusted.
- For rope tightening make spring winding 1,5-2 turns (fig. 22.2) and fix it in this position tightening tip bolts.

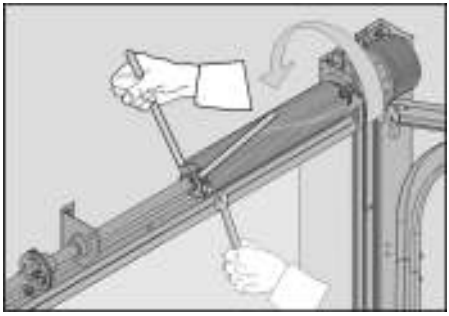

Fig. 22.2.

In case one of the ropes is still sagging, the sag can be eliminated by simultaneous shaft turn (fig. 23), which is provided by a coupler construction (it has slot holes for tightening screws).

For that unfasten coupler tightening bolts, turn the shaft on which side there is sagging, holding another shaft in initial position. After eliminating rope sagging fix tightening bolts of the coupling.

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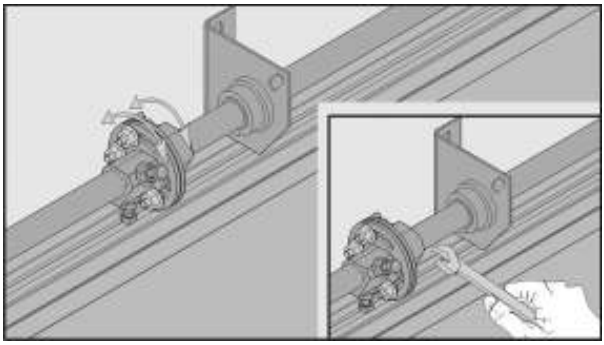

Fig. 23.

When the doors are completed with continuous shaft for sag elimination of one of the ropes do following:

- Lift a panel to loosen rope and fix the panel in such position with the help of supports;
- Unfasten the fixating screw of the rope in a drum;
- Adjust rope working length as needed;
- Fasten the fixating screw of the rope in a drum;
- Pull down the panel in the initial position and check the evenness of rope tension.

4.4.3 SPRING BREAK DEVICE PREPARATION

Spring break device preliminary adjustment (fig. 24) is the following:

1) Move the spring break device to inner bearing inserting of spring break device bearing rod. Fixing plane cog should enter the slot.

2) Fix the ratchet wheel on the bearing rod, fastening installation bolts. To provide the access to installation screws, it's possible to turn the shaft.

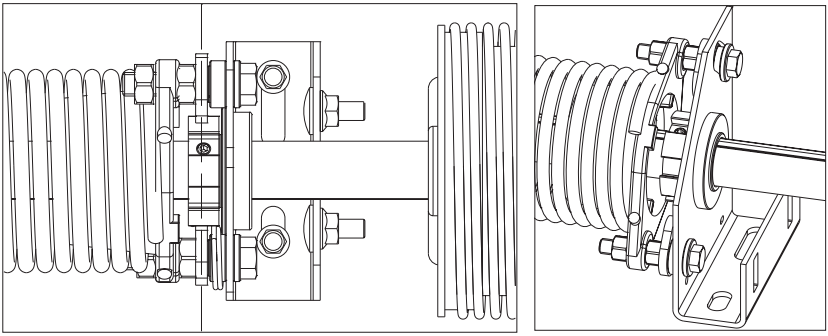

Fig. 24.

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4.4.4 INSTALLATION OF THE FOLLOWING LEAF SECTIONS

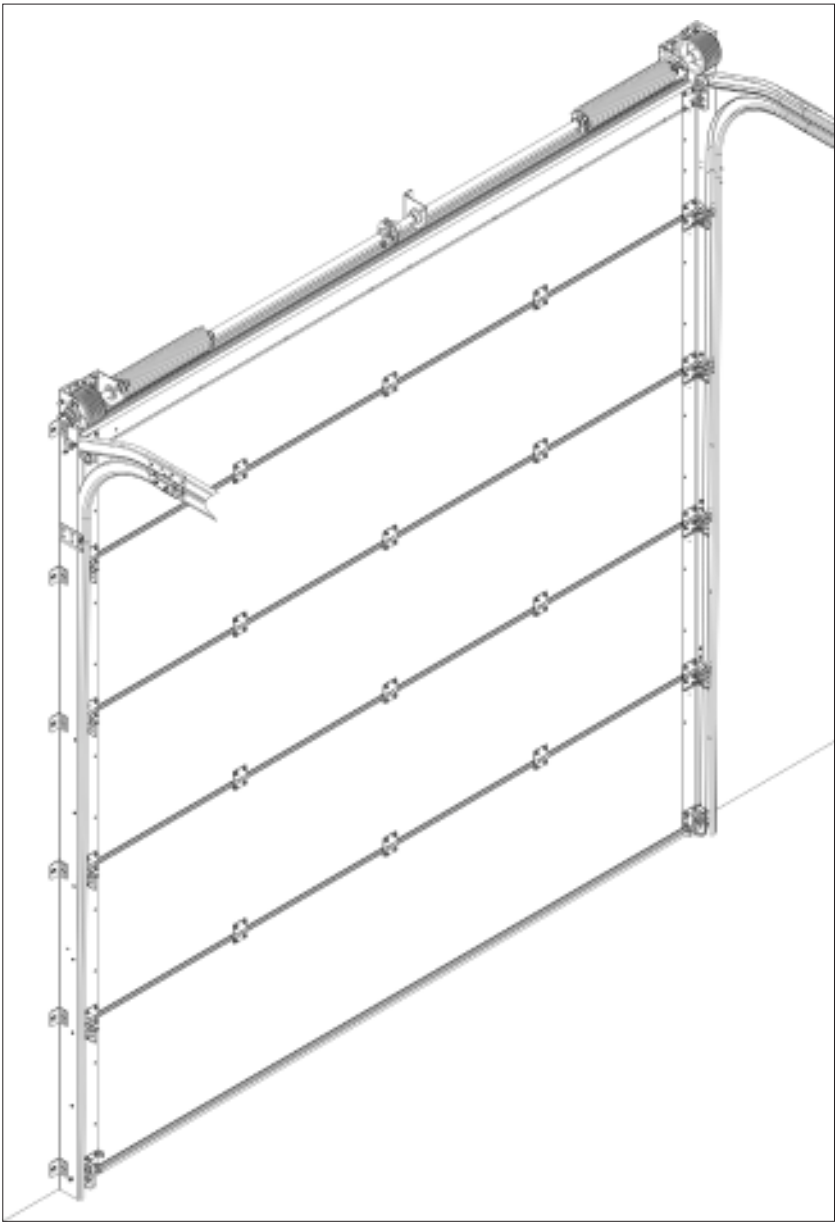

Fig. 25.

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1) install panel on the previous one. Panel ends should be in one plane.

2) fix top side hinge half-loop, installed on the previous panel, to the panel with two 6,3×16 self-tapping screws (fig.25.1). The panel should be strictly vertical;

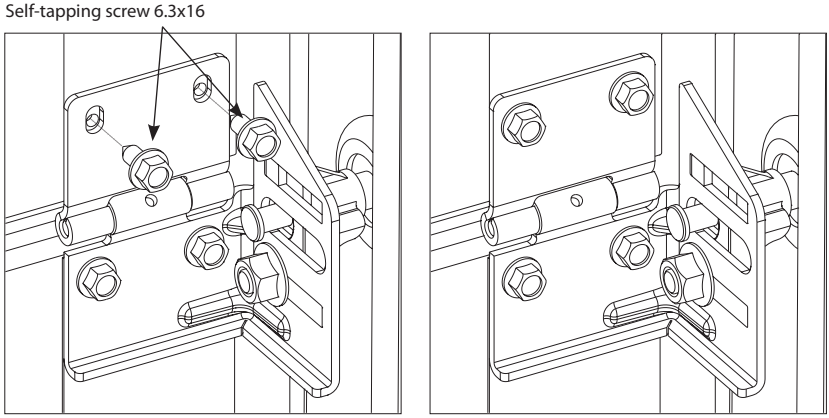

Fig. 25.1.

3) install intermediate hinges, fix each with four 6,3×16 self-tapping screws (fig. 25.2);

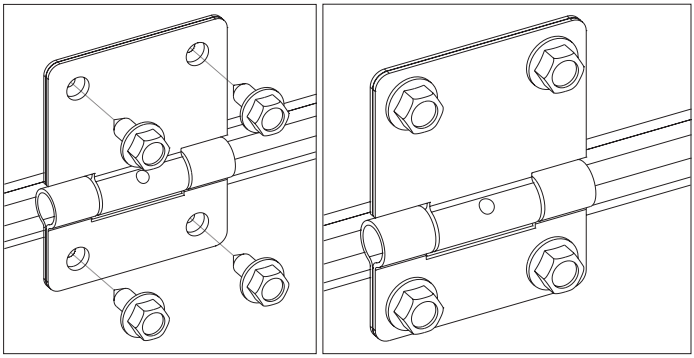

Fig. 25.2

4) install and fix side hinges to the section and so on.

After side and intermediate hinge mounting check and adjust if necessary runner installation. The roller should border upon vertical track path and should freely rotate manually.

The rope should be placed behind side hinge rollers.

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4.4.5 TOP BRACKET INSTALLATION

- Put Litol-24 lubricant on rollers.
- Place runners into top bracket roller holders.
- Place roller into front guiding profile of the horizontal tracks.
- fix each bracket on the panel with the help of 4 self-tapping screws 6,3×16

In fig. 26 top bracket installation on doors with manual control is shown:

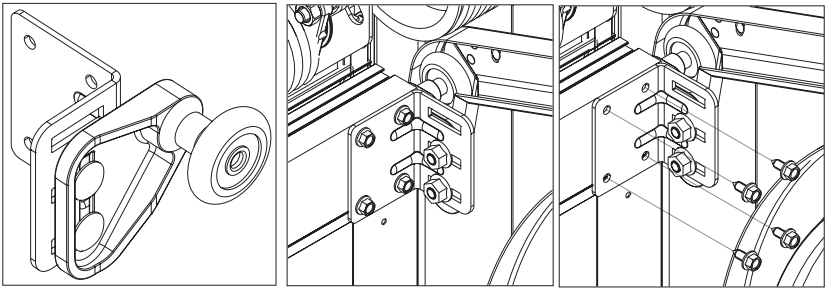

Fig. 26.

In fig.27 top bracket installation on doors with electric drive is shown.

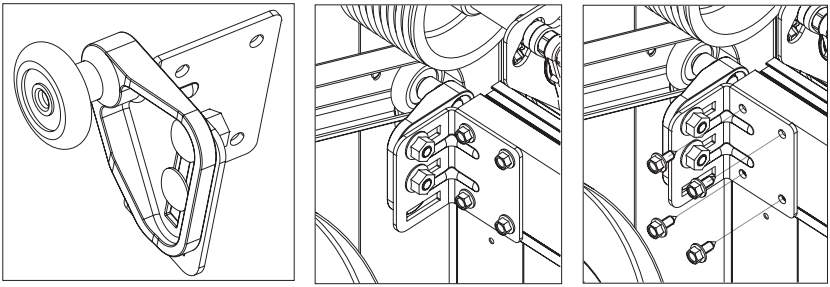

Fig. 27.

4.4.6 TOP BRACKET POSITION FINAL REGULATION

Close fitting of door section to a door strip is provided by top roller proper position adjustment.

The adjustment is done in the following order:

- Loosen the fixation of top bracket roller holder so that it could move
- Press on the top panel from the inside until it touches the door strip sealing profile.
- Move roller holder in the direction needed:
  - On doors with manual control the runner should bear against profile part of the front guide profile (fig.26).
  - On doors with electric motor the runner should be placed near the upper side of the front track (fig.27).
- Fasten roller holder fixing nuts.

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4.5 DOOR LEAF INSTALLATION. DOORS WITH A WICKET

4.5.1 LEAF WITH A WICKET ASSEMBLY

The mounting of bottom and top brackets, side and intermediate hinges in the door curtain with the inbuilt wicket is performed in the same way as with the doors without wicket.

Door curtain mounting has its own peculiarities and is performed in the following way:

- install the bottom section on the place of mounting (рис.28). Using supports if necessary place the section horizontally. The supports are installed under bottom section side stops. Bottom stop end positioning plane should match zero mark plane (wearing floor level).
- Install an eaves lath under the end profile of the bottom section at the central axes of the wicket.
- Check horizontality of mounted section with carpenter's level, placed on panel head and wicket wings (fig.28).

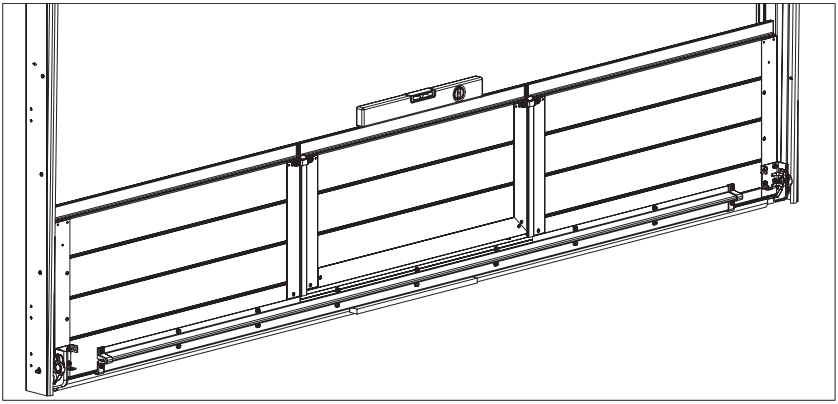

Fig. 28.

- At the mounting of wicket door sections planes of intermediate sections must coincide (fig. 29). Adjustment of sections in vertical position is carried out with the help of side hinges;

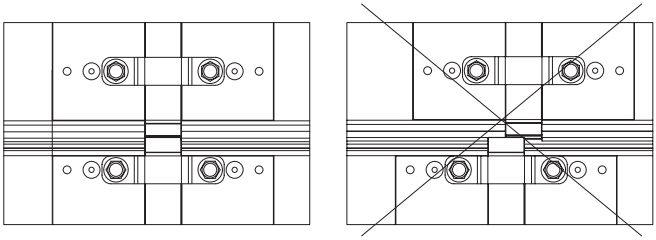

Fig. 29.

- After installing the wicket sections it is necessary to unwind self-tapping screws and remove transport braces (рис.30). Way of removing the braces – top-down;

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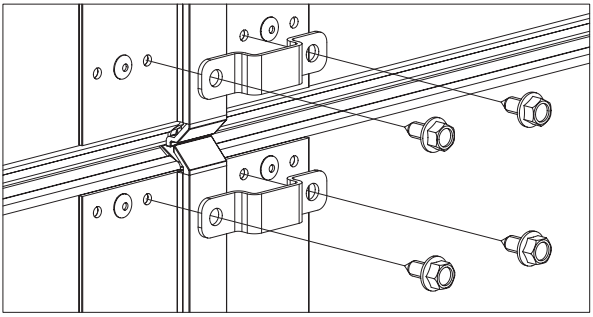

Fig. 30.

- Place hinges on wicket passage framing and wicket leaf, fix them with 6,3 × 16 self-tapping screws. Hinge positioning is shown in Pic.31.

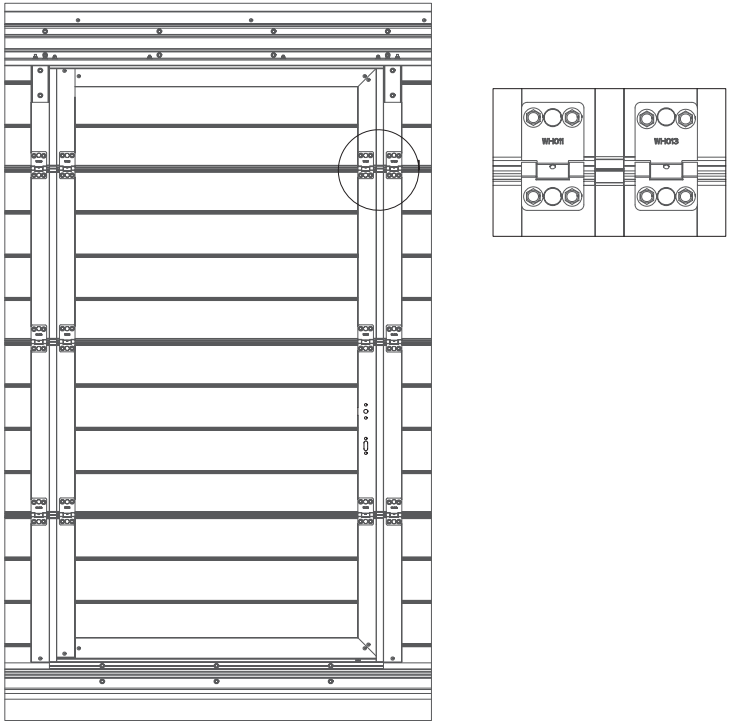

Fig. 31.

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- Open the wicket and remove remote intermediate plates (fig .32)

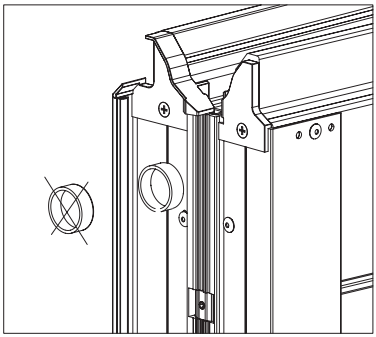

Fig. 32.

4.5.2 CYLINDER KEY MECHANISM AND PUSH HANDLE INSTALLATION

Installation of cylinder mechanism of the lock is shown in fig. 33.

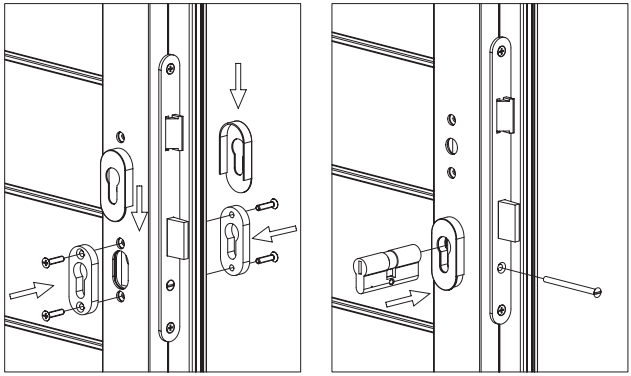

Fig. 33.

Installation of wicket handles is shown in

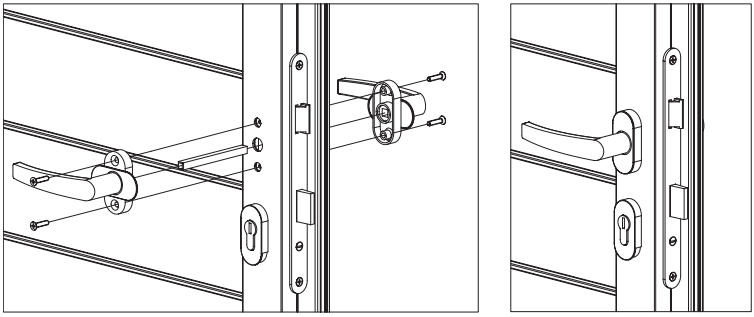

Fig. 34.

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4.5.3 SAFETY GEAR ADJUSTMENT

Two safety gears are used to prevent the sagging of the wicket when it is closed.

Safety gears are fixed on the end of door curtain with screws. Fixing devices are installed on the end of the wicket. When the wicket is closed fixing device enters in the gear groove. Groove apertures in the gears allow to regulate the gear positioning at height. (fig.34)

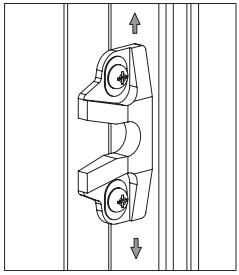

Fig. 34

4.5.4 WICKET DOOR CLOSER INSTALLATION

Pusher is installed on the door curtain from inside.

Pusher should be positioned in such a way that wicket closing effort regulation nut (spring tension) is placed from the side opposite to ledge (from the side of wicket opening hinges).

Pusher installation is performed in the following way:

- remove the protective cap of the pusher;
- install a pull bar on the mounting shank end of the shaft and fix it with a screw. The pull bar should be placed at an angle to the pusher's plane. (рис.35.1);

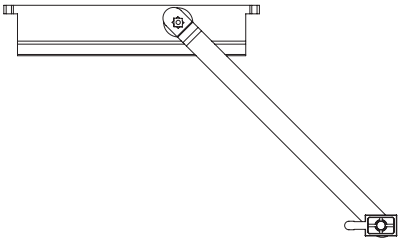

Fig. 35.1

- Place pusher rod roller into guiding groove of the wicket passage framing profile (fig. 35.2);
- Fix pusher box on the wicket with four self-tapping screws supplied with the pusher. Screws are wound into apertures preliminarily prepared by the manufacturer;
- Make door closer adjustment if necessary;
- Install door closer protective cover and fix it with two screws.

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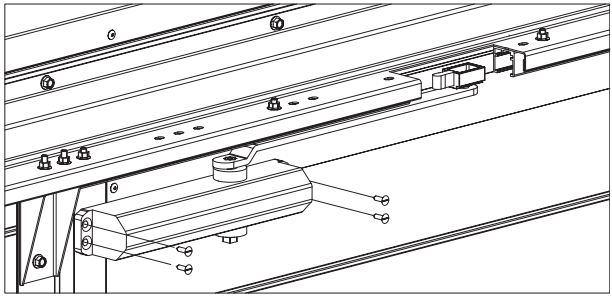

Fig. 35.

DOOR CLOSER ADJUSTMENT

In door closer construction the following adjustments are foreseen:

- Wicket closing speed;
- Wicket pressing speed
- Breaking intensity when the wicket opens;
- Wicket closing efforts.

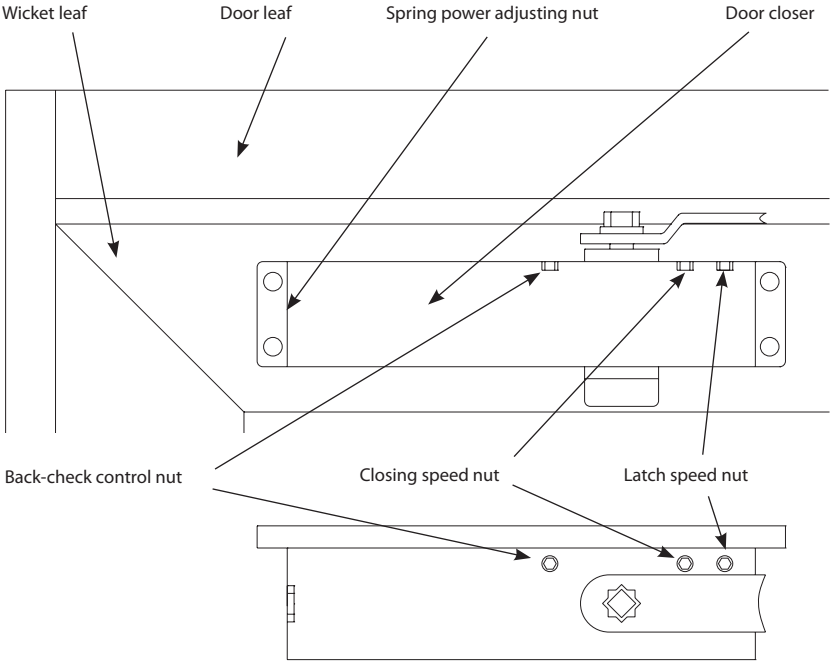

Fig. 36

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When all adjustments are been made fulfill the requirements below and also the requirements of the Manual enclosed to door closer by the Manufacturer.

Wicket closing and pressing speed adjustment

Closing cycle consists of two consecutive stages: wicket preliminary closing and compressing (fixing).

Door closer has the following factory setting:

- Wicket closing cycle starts when opening angle is approximately 70 degrees.
- Wicket compressing starts when the opening angle is approximately 10 degrees.

Leaf speed on the compressing stage is established much lower than on preliminary closing stage.

Wicket closing and compressing speed change is done by turning two definite screws (valves) placed in the closer body.

First adjust wicket closing speed and then wicket compressing speed.

For wicket closing DECELERATION turn the closing speed screw CLOCKWISE.

For wicket closing ACCELERATION turn the closing speed screw ANTICLOCKWISE.

Wicket compressing speed adjustment is done with a closing speed screw analogically.

Slowing-down intensity adjustment when closing the wicket

The closer is factory adjusted in such a way that when the wicket opening angle is more than 70 degrees wicket slow-down happens.

For wicket slow-down intensity increase turn the back-check control screw CLOCKWISE.

For wicket slow-down intensity decrease turn the back-check control screw ANTICLOCKWISE.

WARNING!

1. It is prohibited to turn wicket closing speed screw, compressing speed screw, back-check control screw more than 2 turns ANTICLOCKWISE from factory adjustments. Larger turn may lead to hydraulic liquid leaking out.

2. It is prohibited to cut off slow-down adjustment valve.

Wicket closing effort adjustment

Wicket closing effort factory adjustment is made in such a way that for normal exploitation you do not need to change it.

If for some reason it is necessary for you to adjust wicket closing effort it is done in the following way.

For wicket closing effort INCREASE turn the spring power adjusting nut CLOCKWISE.

For wicket closing effort DECREASE turn the spring power adjusting nut ANTICLOCKWISE.

Wicket closing effort adjustment range is ±9 turns relatively factory adjustment.

It is prohibited to make adjustments more than established range.

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4.6 SPRING BREAK DEVICE ABRASION CHECK

Spring break device abrasion check is done in the following way:

1) Wind the spring for 1-2 turns. Fixing plane cog should come out of ratchet wheel slot.

2) Loosen the spring tension. Fixing plane cog should enter ratchet wheel slot. There comes the stopping of torsion shaft.

4.7 SPRING TENSION

4.7.1 It is necessary to prevent any door lift prior to adjusting a spring tension

Be careful while by tensioning the springs, use tensioning tool of proper size.

4.7.2 Spring tensioning is done in the following order:

- release spring fitting bolts;
- Insert drive into spring fitting slot below (fig.37).
- While turning the drive, turn over tip for a quarter of turn.
- Holding the first drive, install the second drive into the next spring fitting slot.
- Holding the second drive, remove the first drive out of spring fitting slot.
- Repeat steps 2-4 making the proper number of spring tensions. The proper number of turns for tensioning of each spring is presented in the door table.
- Check the number of spring tension turns by the number of turns made by marking line.
- After tensioning, for the purpose of turn-to-turn friction reduction, stretch the springs in the axis direction for 5-10 mm until there are gaps between the turns. Install square key into shaft and spring fitting slots;
- fix in this position, fastening tips bolts;
- Extract the drive from the tip slot.

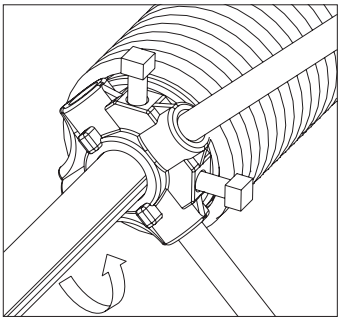

Fig. 37.

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4.7.3 Check door balancing

For this purpose lift door leaf for about half of the passage height. Door leaf should be held in this position. If the leaf is taken down or up, it's necessary to conduct additional adjustment of spring tension. Increase or decrease of spring tension is allowed within the limits of 1-2 turns.

4.8 DOOR LEAF LIMITER INSTALLATION

Door leaf limiter installation – rubber stoppers - is done in the following way:

- Carry out full door leaf lift, mark on track top section extreme position, lower the leaf.
- Make the marking and drill the aperture with diameter 6,5 mm in horizontal track lower part for rubber stopper installation.
- The distance from roller extreme position and the rubber stopper when the doors are fully open should make 100 mm;
- Install the rubber stopper and fix it with M6x16 roundhead bolt and nut (fig.38). Limiters are installed on the left and right tracks.

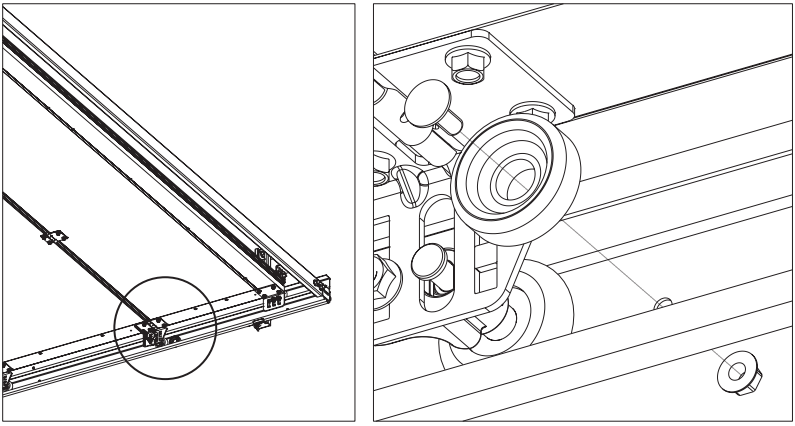

Fig. 38.

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4.9 DOOR LEAF CONTROLS INSTALLATION

4.9.1 HANDLE MOUNTING

Handle installation art.HGI006 is performed through 2 apertures made in the door curtain. Handle set includes two pulls 1, two remote hubs 2, two overlays 3 (fig.39). While the mounting pulls are tied with two screws and nuts. Screws are installed at the inner side of the doors. (fig. 39.1).

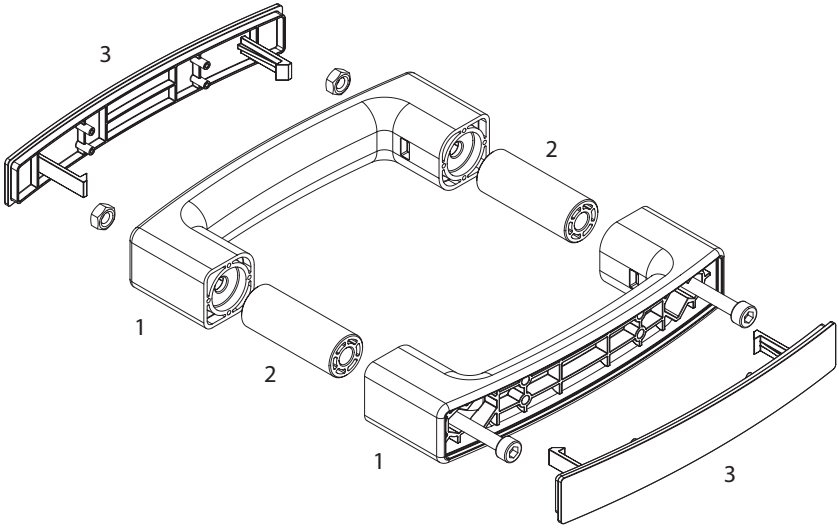

Fig. 39 Handle set HGI006

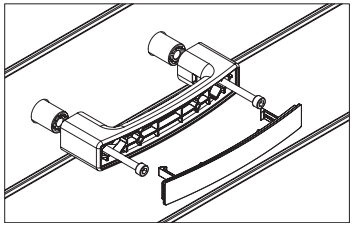

Fig. 39.1 Handle installation. Inside view

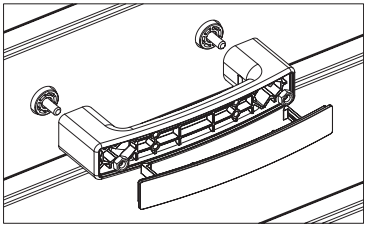

Fig. 39.2 Handle installation. Outside view

Handle art.HGI007 is installed into the aperture made in the door curtain. Handle set includes a pull 1 with a bearing plate 2, an overlay 3, a pan-shape handle 4, insulation sealing 5 (fig. 40). While the mounting pulls are tied with screws and nuts. Screws are installed at the inner side of the doors (fig. 40.2). After the handle is fixed it is required to install caps that close the nuts.

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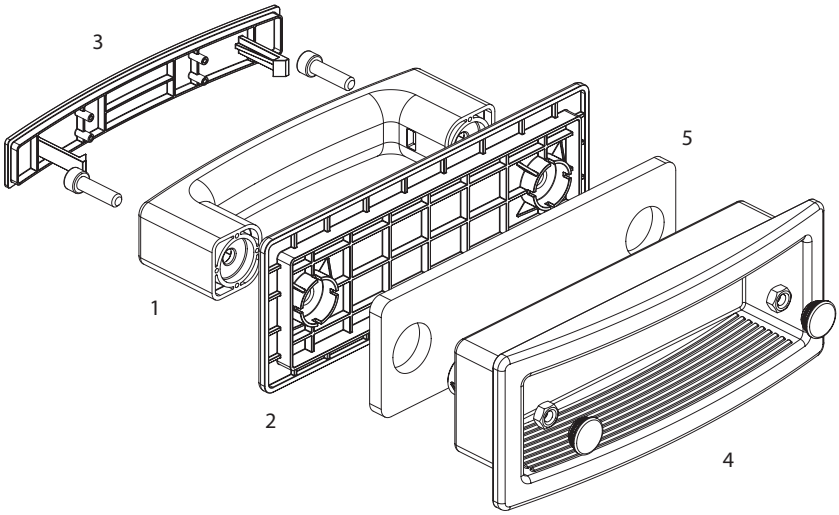

Fig. 40. Handle set HGI007

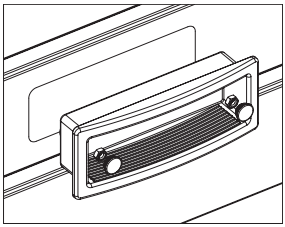

Fig. 40.1. Handle installation. Outside view

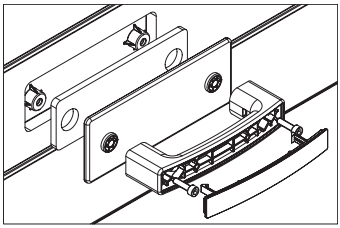

Fig. 40.2. Handle installation. Outside view

4.9.2 LOCKING BAR INSTALLATION

Locking bar (fig. 41) is installed into four apertures made in door leaf section. Locking bar is fixed with four 6,3x16 self-tapping screws.

When mounting a locking bar it is needed to make an aperture with diameter of 16 mm in bearing rod.

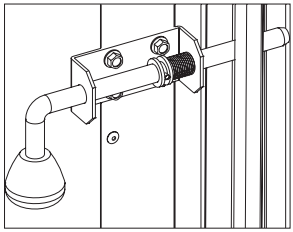

Fig. 41.

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4.9.3 PULL ROPE FASTENING

Pull rope fastening is shown in fig. 42 and 42.1. The upper end of the rope is fixed to horizontal track joint plate, the lower end is fixed to bottom bracket ear.

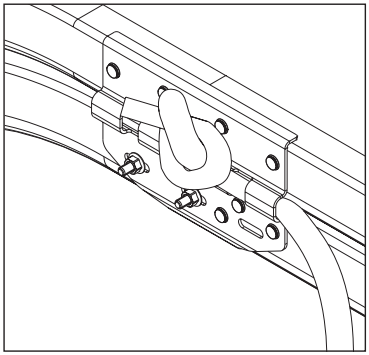

Fig. 42. Rope fixing to track

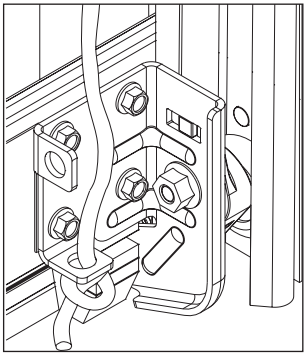

Fig. 42.1 Rope fixing to bottom bracket

4.9.4 HKU001 MANUAL LIFT BLOCK INSTALLATION

Rope for manual lift/pull down of door leaf can be supplied with HKU001block and a rope.

Fig 43 shows the scheme of block fixing to horizontal track. Before block installation it's necessary to make four apertures of 6.5 mm in diameter in the track.

The block is fixed with four M6×16 press-bolts and nuts.

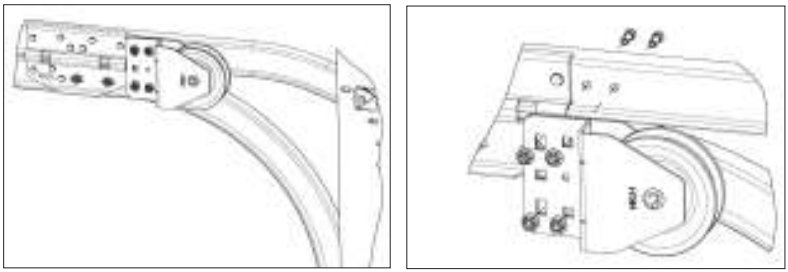

Fig. 43. HKU001 block fixing to horizontal track

Fig. 43.1 shows rope fixing scheme. Rope branches are fixed to bottom bracket ears.

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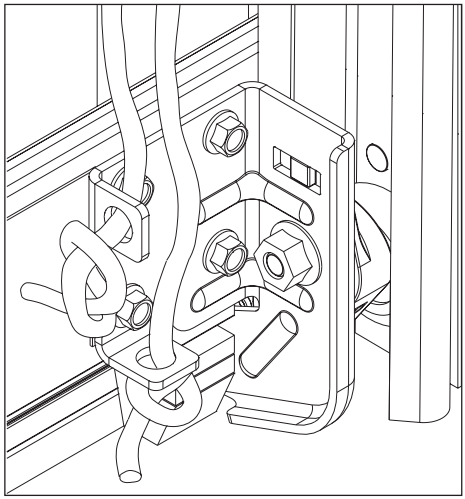

Fig. 43.1. Rope fixing

4.9.5 INSTALLATION OF A BLOCKING DEVICE

Mounting of the locking device RLG003 (fig.44.1, 44.2) should be performed according to the "Installation Manual for locking device of garage doors".

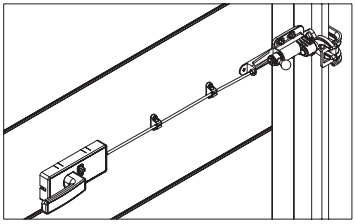

Fig. 44.1. Locking device Inside view

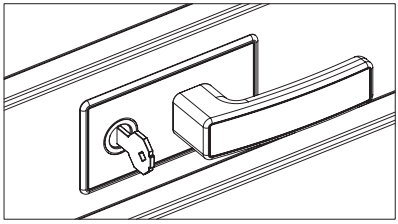

Fig. 44.2. Locking device Outside view

4.9.6 ELECTRIC MOTOR INSTALLATION

Installation, connection and adjustment of electric motor and automatic mechanism elements should be done according to the requirements of corresponding mounting and adjustments manuals.

Electric motor rail should come along the passage axis.

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5. FINISHING WORKS

By sealing of joints and gaps it's necessary to use compressors in tubes (silicon-, polyurethane-, acryl-based). Filling foams should not pop-up. By using polyurethane foam it's important to check on door elements not to change their form.

After consolidation of sealing material that comes out of bearing rods' plane, they are erased, and if necessary the decorative sealing of joints can be done.

By sealing of separate joints and gaps, that are more than 3 mm in size, there should be used plasters, compatible with passage material and allowed to use by the Customer.

Before conducting of plastering works it's necessary to protect doors from ingress of splashes mortar mix, concrete, gypsum.

After finishing mounting works remove protective film from panels. Clean dirty spots on doors. Door cleaning is done with clean water and mild washing liquids with a sponge or soft cloth.

For window cleaning, if necessary, use liquids for cleaning plastic. Washing liquids used must be neutral to acryl and polycarbonate. Don't use abrasive washing liquids or window washing liquids, containing alcohol.

6. ADJUSTMENT, TESTING AND CHECKING OF THE PRODUCT

After door mounting carrying out check keying devices and electric drive programming.

Door operability should be checked by five times leaf "lifting-lowering" cycle.

For doors with electric drive check additionally automation on every mode programmed.

7. HANDLING OVER OF MOUNTED PRODUCTS

Installed product handling-over to Customer is carried out in the following order:

- Full door operational demonstration is carried out by the representative of the Organization that carried out door mounting;
- Fulfillment of part "Mounting Certificate" in the Passport is carried out:
  - Product implementation date is recorded;
  - Signature of a person (with clarification) responsible for mounting is set;
  - Data of the organization (name, address, tel.number) that carried out door mounting is fixed;
  - Stamp of the Organization that carried out door mounting is put.

«Mounting Certificate» is signed by the Customer with stamping (if there is one with the Customer).

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APPENDIX. SAFETY MEASURES

GENERAL REQUIREMENTS

Door mounting should be done only by qualified specialists, who know door design and door mounting technological process, trained and instructed on security measures.

Mounting works are allowed to be done only in work wear, not limiting movement, and also in a skull guard.

On material drilling, that have thrown chips, by metal chopping or cutting it's necessary to use protective glasses. A respirator should be used to protect respiratory apparatus from building dust.

Fitter's hammers and sledge-hammers should have smooth, a little bit convex surfaces of flats, without dents, slants, handerings, chips and splits. The length of hammer handle should be no more than 250 mm, and sledge-hammer handle length –no more than 700 mm; hammers and sledge-hammers should be firmly fit on handles and fixed by wedges.

All the tools that have sharpened ends for handles (files, screw-drivers etc.), should have length of handles of not more than 150 mm. Wooden handles should be tightened by bandage rings.

Percussion devices (chisels, plugging chisels, mandrels, punches) should not have oblique and battered shanks, splits, burs. Length of chisel, plugging chisel should be not more than 150 mm, including tapered part of a chisel, it should be not more than 60-70 mm; cutting edge – straight or a little bit convex.

Wrenches should not have splits or nicks, and should match sizes of nuts and bolt heads; wrench jaws should be parallel, not worked out or rolled.

To move working tool to work place it's necessary to use special bag or box. When working on the tool boxing it's necessary to use special belts. It's prohibited to put tools in the pockets of work wear.

SECURITY MEASURES BY WORKING AT HEIGHT

Works at heights of 1,5 m and more from the floor surface are considered works, conducted at height.

Works at height of 5 m from ground surface, overlaps or working platforms and stages, are considered steeplejack works. Health state of people doing steeplejack works, should meet medical requirements, set for workers doing this type of work.

Safety mounting belt should be used by working at heights.

In case it's impossible to fix safety belt to the elements of building construction, it's necessary to use safety rope, which has been set behind the construction elements in advance. The works, in this case, are fulfilled by two mounting workers.

Devices and tools should be fixed (tightened) to prevent their falling when working on the constructions, under which there are current-carrying parts alive.

IT'S PROHIBITED to use safety belts with metal chain slings by work with constructions, under which there are current-carrying parts alive.

Endless cable should be used for upward supply of door elements, tools and mounting devices. The worker standing below should hold the cable to prevent load swinging and coming it close to current-carrying parts.

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IT'S PROHIBITED TO:

- stand under the ladder, on which the works are held;
- throw up anything for the worker above. The supply should be done with the help of a strong rope.

SECURITY MEASURES BY WORK WITH THE USE OF LADDERS AND STEPS

Ladders and steps should be supplied with a device, preventing possibility of shear and turn over by working. Bottom ends of ladders and steps should have binding with sharp ends дляfor installation on soil, and for using ladders on smooth surfaces (metal, tile, concrete), shoes from rubber or other material are used.

IT'S PROHIBITED TO:

- work with a ladder when standing on steps which are less than 1 m away from its upper end;
- work with power tool from ladders;
- work on two last steps of ladders that do not have railings and stops;
- stand on steps ladder or step-ladder for more than one person;
- stand under the ladder, where the work is held;
- put a tool on ladder steps.

SAFETY MEASURES BY WORK WITH ELECTRIC TOOL

Work with electric tools is allowed for people specially trained and instructed on the working place, and also have proper qualification group on electrical safety.

Electric instrument working at voltage not more than 380/220 V should be used by mounting works. The choice of electric instrument class is done according to the category of premises on the degree of electrical shock hazard.

Metal electric tool body, working on voltage more than 42 V of AC current and more than 110 V of direct current in the premises of heightened danger, specially dangerous and in outside mounts, should be grounded. Shifter fork should be with ground contact. Tool switching is made to grounded network. Extenders used should have a plug and a socket with ground contact. By work with such a tool it's necessary to use preservers (rubber gloves, galoshes). Preservers should be tested according to established legitimate procedures.

Before starting the wirk it is necessary to do the following:

- check the set for completeness and for reliability of fixing parts;
- external examination check for cable intact (cord), its protective pipe and plug; integrity of isolating body parts, handle and brush holder caps; availability of protective covers and their servicing; ground network servicing check (between body and plug ground contact;
- switcher definition functional check;
- functional check of electric instrument out-of-chain hoist.

By work use only serviceable tool, tested and sealed.

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Prevent breaks, bending of electricity cable, and also laying it in the places of construction material piling, traffic flow. By work in rainy weather (by snowfall) the places of cable laying and the places where the works with electric tools are being conducted should be covered by tents.

By work with electric tools IT'S PROHIBITED to:

- hold a tool at the cable;
- remove chips and sawdust from a cutting tool, as well as to change cutting tool until it's fully stopped. Fixing of a changeable working tool should be done by a proper instrument;
- switch electric tool to network with characteristics, that do not meet the requirements indicated in engineering manual;
- move electric tool from one working place to another with the engine switched on;
- leave unsupervised the instrument switched to network, and a tool with working engine;
- leave unsupervised electrified tool to prevent using it by strangers.

If electric tool body is getting hot it's necessary to make routine breaks. If there is a smell or smoke, loud noise or vibration, immediately switch the instrument off of network till the fault is handled.

By conducting work, it's necessary to prevent direct contact between cable or wire, powering electrified tool, and metallic items, hot, wet or oil-covered surfaces to prevent electric shock injury by insulant damage. It's necessary to check the places of wire points to the contacts of manual electrified tool, they should not be any tension, and wires should not have any fractures.

Crossing of electric wire (cable) with electrical welding wires, supply hose of oxygen, acetylene and other gas is prohibited.

SECURITY MEASURES BY CONDUCTING INSTALLATION AND WIRING WORKS

Installation and wiring works should be done according to «Procedure for electrical installation design» (PEID) with meeting the requirements of «Safety regulations by electrical installation operation» (SR by electrical installation operation).

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